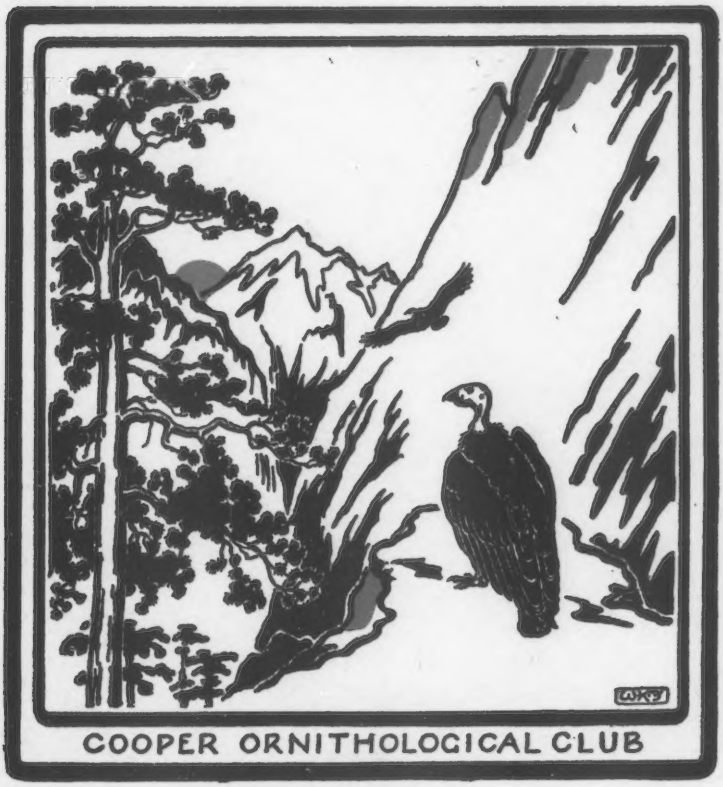
THE CONDOR

A Magazine of Western Ornithology

Volume XLI March-April, 1939 Number 2



COOPER ORNITHOLOGICAL CLUB

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Published Bi-monthly by the Cooper Ornithological Club
Entered as second-class matter May 15, 1925, at the post-office at Berkeley, California, under Act of Congress of February 28, 1925, Section 412, paragraph 4.
Issued from the Office of THE CONDOR, Museum of Vertebrate Zoology, Berkeley, California.

SUBSCRIPTION RATES

Three Dollars per Year in the United States, payable in advance.
Fifty Cents the single copy.
Three Dollars and Twenty-five Cents per Year in all other countries in the International Postal Union.

COOPER ORNITHOLOGICAL CLUB

Dues are payable in advance on January first for the calendar year: Three Dollars per year for members residing in the United States; Three Dollars and Twenty-five Cents in all other countries. Members whose dues are paid receive THE CONDOR without additional charge.

The Life Membership fee is Seventy-five Dollars. No additional dues are required, and the money is invested and the interest only is used for Club publications. Life Members receive The Condor without additional charge.

Send manuscripts for publication to the Editor, J. GRINNELL, Museum of Vertebrate Zoology, Berkeley, California, or to either of the Associate Editors, JEAN M. LINSDALE and ALDEN H. MILLER, same address.

Send dues and subscriptions to JOHN McB. ROBERTSON, Associate Business Manager, Buena Park, California; orders for back numbers of THE CONDOR and the PACIFIC COAST AVIFAUNA series to W. LEE CHAMBERS, Business Manager, 2068 Escarpa Drive, Eagle Rock, California.

Issued March 15, 1939

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THE CONDOR

VOLUME XLI MARCH-APRIL, 1939 NUMBER 2

THE MISSISSIPPI KITE IN SPRING

WITH EIGHT ILLUSTRATIONS

By GEORGE MIKSCH SUTTON

The Mississippi Kite (*Ictinia misisippiensis*) is a well known summer resident in parts of western Oklahoma. While not found in the Panhandle (save at the extreme eastern end) it is widely distributed throughout the western half of the main body of the State, in some sections being downright abundant.

Eager to become acquainted with this beautiful bird, I went to Oklahoma in the spring of 1936, establishing headquarters at Arnett, Ellis County, on May 7. Here I remained almost continuously for the following six weeks, devoting a large part of my time to observing Kites. I used an automobile, driving from fifteen to fifty miles a day in reaching various parts of the County. Nests were not difficult to locate as a rule, owing to the fact that trees were scarce.

In 1937, Messrs. John B. Semple, Karl Haller, Leo A. Luttringer, Jr., and myself again visited western Oklahoma, encountering the Kites in the vicinity of Indiahoma, Comanche County, on May 7 and 8; near Cheyenne, Roger Mills County, from May 9 to 15; in eastern Beaver County from May 16 to 18; and again (from May 26 to 31) in the vicinity of Arnett, Ellis County.

The following paper deals, then, with the earlier part of the Kite's nesting season —the return from the south, the selection and defense of the nesting-territory, the building of the nest, the laying and incubating of the eggs. During the course of our work several adult Kites were collected. From these specimens interesting data concerning food, weight, and internal and external parasites were obtained.

Kite Habitat in Oklahoma.—Scattered tree-growth is characteristic of Oklahoma's Mississippi Kite country. Most of the trees growing in the immediate vicinity of Arnett are small—locusts, bois d'arc, soapberries, hackberries, elms and introduced catalpas. From six to ten miles south of Arnett, along the South Fork of the Canadian River, there are well wooded sections, however, with huge willows and cottonwoods lining the tributary streams, and persimmons and walnuts growing here and there. In the vicinity of Gate the Kite is to be found in clumps of cottonwoods in the open plains country. Near Cheyenne, Roger Mills County, the thinner woodlands are preferred by the bird. The country to the south and east of Arnett is known as "shinnery country." Here grows a small scrubby oak, much of it only a foot or so high, the largest trees not more than fifteen or eighteen feet high, that is called the "shinnery" oak (*Quercus mohriana*). Here the Kite is abundant. Here, in the gray-green sea of low scrub are "islands" of older trees that have the general appearance of "hammocks" in the Everglades. Too, there are occasional fine cottonwoods, or thin stands of locust. Arnett is in the midst of a vast wheat-growing district, but the "shinnery country" is cattle range and much of it is semi-arid. The Mississippi Kite country that received our especial attention in 1936 and 1937 is at the eastern edge of the notorious Dust Bowl.

Return from the South.—On May 7, 1937, we witnessed the return of the Kite from the south. Six miles north of Indiahoma, Comanche County, we saw a flock of six birds circling slowly northward over the Wichita Mountains. On the following day more flocks appeared, all of them moving northward. Two specimens collected on this date were females. On May 9 the migration was at its height. A flock of over twenty birds was seen high in air not far from Sayre, in Beckham County. On May 10, in the vicinity of Cheyenne, Roger Mills County, we continued to see flocks moving northward. After May 10 we noted no further evidence of migration.

Fig. 17. A pair of Mississippi Kites on their nesting grounds; Ellis County, Oklahoma.
The photographs with this article, figs. 17 to 22 inclusive, were taken by Leo A. Luttringer, Jr.

In 1936 the Kite was present in some numbers at Arnett on May 7, though circling flocks and pairs continued to pass northward that day and the next. May 7, 1936, was a memorably disagreeable day, the trees thrashing wildly in a hot wind, thick dust shutting farmhouses and windmills and telegraph poles from sight.

The Kite may mate before it starts northward in spring. It may mate as it migrates. Certainly many of the birds *appear* to be mated when they arrive in Oklahoma. Many of the northward moving companies are composed of four, six or eight birds. My belief is that the sexes move northward together. Though my experience with the bird is limited, I have yet to see a migratory flock composed entirely of males or entirely of females. Male and female birds are much alike to be sure. Males are recognizable, however, by the *clear* white of their heads and (if females be close by) by their smaller size.

Spring Behavior.—From the first day of my work I was struck with the gentle, almost demure bearing of these birds of prey. During their morning and evening feeding periods they were active enough, but throughout the middle of the day they perched in a shady part of some tree quite literally by the hour, often scarcely turning their heads

for periods of fifteen minutes or more. Observation work at this time was likely to be a little dull, for the birds did not preen, nor chase each other about, nor watch for prey. They simply sat. Occasionally they stuck out a wing or stubby foot and yawned. If, from time to time, they moved uneasily or stretched forward their heads, they presently "coughed up" a neat, damp pellet of reddish brown cricket legs, and settled back into a position of complete repose.

On May 9, 1936, not far from Arnett, I came upon a mated pair that apparently had just chosen (or returned to) their nesting territory. They were sitting side by side in a dead willow that stood by a small stream. One bird, then the other, left its perch as I approached, to circle low above me. Now I heard sharp cries that reminded me of the squeals of an Osprey, and a high, thin *phee-phew! phee-phew!*—a phrase of alarm that I was to hear repeatedly during the ensuing days, that usually was imitated by all Mockingbirds singing within hearing distance, and that may be imitated by a human being better with a shrill whistle than with spoken syllables.

Neither in 1936 nor in 1937 did I see what I would call "courtship antics." This I regard as evidence of early mating, and perhaps of mating for life. To be sure male birds (females, too, for that matter) sometimes "displayed" by cutting capers in air, pursuing the other bird with thin squeals and chipperings, or plunging from a height to swoop upward effortlessly.

Fig. 18. Mississippi Kite on favorite perch near its nest; Arnett, Ellis County, Oklahoma.

On the wing the Kite is graceful, buoyant, usually deliberate. The wings are held horizontally during soaring flight, the short outermost primary (and sometimes also the alula) breaking the line of the front of the wing, the tips of the primaries curving upward but little. The square-tipped tail tilts this way and that as the bird directs its course with precision. So frequently does the Kite hang in air as if suspended, or soar as if there were nothing in the world to do but soar, that we are surprised when we see it stoop at a White-necked Raven, or descend with a roar of wings upon its prey.

So ably does the bird handle itself a-wing that it has little difficulty in catching flying grasshoppers, cicadas, and even dragon-flies. Watching the flower-covered prairies from the clouds it suddenly spreads its tail wide, changes its course, hangs in midair an instant, then shuts its tail and coasts giddily downward, intent upon a killing. It catches the grasshopper with its feet, so easily that we think it has missed until we note that it is on its way upward to the clouds once more, head downward, feet forward, picking the insect to pieces with its beak!

It is not surprising that the Oklahoma cattlemen are fond of the Mississippi Kite. Since their childhood days they have watched these "Blue Darters" or "Locust Hawks" snatching large-sized insects from the air. "They're jes' as noss (nice) as they can be, them Locust Hawks," an old-timer said to me one day. "Why, Ah can remember when Ah used to drahve bunches of yearlin's over Cheyenne way to be branded, an' Ah'd see a whole flock of them hawks flying aroun' jes' waitin' fer us to scare locustas up from the grass. They'd catch 'em, too; swoop down on 'em an' grab 'em outen the air, an' pull offen their heads and eat 'em while they was still flyin'. Once Ah thought Ah'd jes' see what it was one of 'em dropped after he'd got a locust. So Ah went over an' picked whatever it was up, an' it was the locusta's head!" [Note: "Locustas"=locusts=cicadas; locusta's"=locust's=cicada's.]

The Kite usually discards certain tough parts of the insect it captures. On more than one occasion I have run to pick up cricket legs that a feeding bird thirty or forty feet in air had dropped. On the other hand, much tough material is swallowed, as is evidenced by the stomach contents themselves and by the pellets that are cast up.

Physical Condition of Birds in Spring.—On May 9, 1936, I collected the male of a mated pair not far from Arnett. Lifting the bird from the ground, I noted the rich redness of the irides; the delicate chalk-dust bloom that suffused the plumage; the short, stubby feet with their rough, gray-edged scales; and the hint of red-orange that showed high on the inner sides of the tarsi.

In the middle of the under tail coverts I encountered a phenomenon that puzzled me for a time—a roundish area about an inch in diameter throughout which the feather tips were discolored and slightly sticky. Watching the birds closely during their feeding hours gave me an explanation of this phenomenon. Half-eaten grasshoppers frequently were carried a long distance in the talons, tucked into the plumage under the tail. The peculiar, though not offensive, sweetish odor of a living or freshly killed Kite possibly is caused to some extent by this soiling of plumage by half-eaten insects.

The male specimen in question proved to be fat. The testes were much enlarged, being about 20 mm. in length. In preparing the skin I noticed that the inner surface of the dermis was heavily marked with dusky spots. These were the blood-quills of small incoming feathers, perhaps of down. Such spotting on the inner surface of the skin was observed in all of the ten adult specimens taken in 1936, though it was less noticeable in birds collected later in the season.

All 16 specimens collected in 1936 and 1937 were fat, some of them decidedly so. Males weighed from 216 grams (stomach not particularly full) to 269 grams (stomach full), averaging 245 grams. Females weighed from 278 grams (stomach well filled) to 339 grams (stomach contents 6.1 grams), averaging 311 grams. A male bird measured May 28, 1936, had a wing-spread of 35½ inches. A female measured the same day had a wing-spread of 38 inches.

All female specimens had paired ovaries. Aside from the minute blood quills referred to above, no evidence of prenuptial molt of body plumage was observable in either males or females. One specimen, however (a female taken near Indiahoma, Co-

manche County, on May 8, 1937), was completing what appeared to be an abnormal molt of the rectrices.

The irides of both male and female adult birds were clear, deep red; the cere dusky, sometimes with a hint of yellowish brown about the nostrils; the bill blackish; the corners of the mouth dull orange yellow; the feet grayish brown, yellowish on the under sides of the toes, and red-orange on the proximal third of the tarsus.

Nest-building.—The Kite is deliberate about nest-building. From May 7 to 17, in 1936, I wondered whether the birds were going to select territories, or build nests, or lay eggs at all. With the assistance of Mr. R. L. Gray, a Game Ranger, I found two flimsy nests on May 10; but the birds that "owned" these nests appeared to have no special interest in them. When I climbed their "home tree," they flew at me half-heartedly or screamed from a respectful distance. When I watched from a few rods off they sat on dead branches among the leaves, eyeing me complacently.

At that time I did not know that it is customary for the Kites of western Oklahoma to return to their old nest, to linger about their established nesting-territory for days without so much as adding a twig to the ramshackle structure, and to go at their re-

Fig. 19. Mississippi Kite on favorite perch near nest; Arnett, Ellis County, Oklahoma.

modelling work in a leisurely manner—sometimes bringing only two or three twigs, or a few green leaves for the lining, during the course of an entire morning.

One of the two nests found May 10 was in a fair-sized willow tree fifteen feet from the ground, near Packsaddle Lake (seventeen miles southeast of Arnett). When, on

May 17, I returned to examine this nest, I found it destroyed, presumably by fox squirrels that had a nest of their own not far away. By this time the Kites had chosen another site a few rods off, again in a willow tree. I watched one of the birds fly to the new nest with a green willow frond in its feet. While flying, it put its head down, grasped the twig for an instant with its beak, and took fresh hold with its toes.

On the morning of May 19 I chanced to see a Kite perched in a locust tree not far from the highway. Thinking that it might be in search of food I stopped the automobile and watched. It was a male, this I knew from the clear whiteness of its head. As I watched, the bird moved awkwardly out the branch, leaned forward, nipped off a leaf-covered twig, and flew across the highway with the green sprig in its bill. Leaving the car quietly I made my way through the shinnery oak and locust scrub to a tangle whence I could watch the tree toward which the Kite had flown. Soon I saw the female, perched on a dead bough. Not far from her the male stood on the partly finished nest, fussing with his green frond, picking it up, shaking it, dropping it. The female flew to the ground, grasped a small twig with one foot, and flew to the nest. I saw no more nest-building that day, though I watched the completely unfrightened birds for another hour.

Fig. 20. Mississippi Kite on nest in locust tree; Arnett, Ellis County, Oklahoma.

Nest and Nest-site.—During my 1936 sojourn at Arnett, I found forty occupied Kite nests. All of these were in locust, elm, hackberry, willow, or cottonwood trees, save two which were in shinnery oak. At least twenty of the forty had been used in preceding years. Most of them were surprisingly low, from ten to fifteen feet from the

ground. The two highest, perhaps thirty feet up, were in cottonwoods. One nest, situated at the edge of a clump of shinnery, was less than six feet from the ground. Thrilling it was to be able to look *down* at the incubating bird from horseback, to admire the soft breadth of the gray back, to catch the gleam of suspicion from the red eye. Mr. Jake Gross, a cattleman who was good enough to help me locate Kite nests, and who was my gracious host on several occasions, told me that he had found many nests only five or six feet from the ground, out in the shinnery range.

The nests were flimsy affairs, made of twigs from two to fourteen inches long, and lined with green leaves. An average nest (collected near Cheyenne, Roger Mills County, in 1937) measured 13½ by 9 inches, was 5 inches deep, and had a cup about 1½ inches deep. This nest was made entirely of cottonwood twigs and lined exclusively with cottonwood leaves. Most of the nests found in 1936 and 1937 were situated in crotches close to the main trunks of small or middle-sized trees. Some, however, were placed far out on long branches of large trees. Others were built into the bushy tops of small locusts or hackberries. In two instances *new* nests were constructed in poorly chosen sites. The first of these, built ten feet from the ground in a slender locust, fell with the tree in a gale; the second, built on a branch overhanging a much used road, was abandoned before the eggs were laid.

Many a last year's nest is put into shape for use with the addition of a small handful of twigs and a lining of fresh leaves. These leaves often are gathered from the very tree

Fig. 21. Mississippi Kite near its nest; Arnett, Ellis County, Oklahoma.

in which the nest is situated, but sometimes they are brought from afar. Not infrequently a green twig six or eight inches long is brought to the nest to be plucked of its leaves and shoved off to one side.

The nest-tree usually stands in the open. If the Kites elect a woodland for their nesting-territory, they almost invariably place their nest somewhere along the outer edge. At Arnett they showed no special preference for trees growing near water, though several pairs nested along a tributary to the South Canadian that flowed through the Grady Word Ranch ten miles south of town.

Oviposition and Incubation.—It is not easy to determine *exactly* when a bird's egg is laid. Especially difficult is it with large-sized, tree-nesting species where a climb is necessary each time the nest is examined and where there is danger of causing the birds to desert. By mid-May, 1936, I had located a score of Kite nests near Arnett. But at that time I was not sure which of these were actually in use. On May 19, early in the morning, there was an egg in one of the "old" nests that I had found several days before. Since I had not watched this nest constantly I do not know when this first egg was laid. I do know, however, that the second egg was laid more than 24 hours later. And by visiting the nest at least twice a day for the following eleven days, then again from June 7 to 18, I determined that the male shared the duties of incubation with the female; that one bird or the other was always on or close to the nest during the day; that the bird not actually on the eggs at night slept in a tree close by; and that the period of incubation was at least twenty-nine and probably not more than thirty-one days.

It is customary for male and female Mississippi Kites to share the duties of incubation. On May 28, 1936, however, I collected a set of eggs with both parent birds, finding a well-defined brood-patch on the belly of the female, *no brood patch whatever* on the belly of the male. I can offer one explanation of this: The male may have been a new mate, replacing one that had recently been killed.

Eggs.—In 38 of the 40 Kite nests under observation in 1936 there were two eggs. In two nests the complete set was one egg. All nests (14) found in 1937 contained two eggs. We did not find a nest with three eggs, though such sets were reported. The eggs were bluish white, wholly unmarked as a rule, though nest-staining sometimes gave them a clouded, blotched, or marbled appearance.

Newly Hatched Young.—Early on the morning of June 18, 1936, I saw my first newly-hatched Mississippi Kite. It was a lovely creature, its down pure white with a small, faint area of buffy brown on the nape and a wash of the same pale brown over the back and upper surface of the wings. The region in front of and about the eyes was dull gray, the marking occupying almost precisely the same position as the black facial mask of the adult. The bill was dull blue-gray, the cere dull brownish-orange, the corners of the mouth light orange. The feet were pale, clear yellow-orange with gray claws. The eyes were dull gray-brown, with bluish pupils; the eyelids dull gray. In an attitude of repose the baby bird rested on the *outer* part of its feet (tarsus as well as toes). Its only cry was a thin, feeble squeal, a hair-thin sound.

I examined the nestling at about seven o'clock that morning. At that time there were no egg shells in the nest and the other egg was not pipped.

Behavior at Nest.—So gentle a bird is the Mississippi Kite that it has few quarrels with its bird-neighbors. Throughout much of its Oklahoma breeding-range, trees are so few that many tree-nesting species of birds are obliged to live in close proximity to one another—White-necked Ravens, Scissor-tailed Flycatchers, Mourning Doves, Mockingbirds, Swainson Hawks, Lark Sparrows, Baltimore Orioles, White-rumped Shrikes, Kingbirds—all these nesting almost side by side. In a cottonwood tree on the Davison Ranch (near Peek, Ellis County) we found a Mockingbird nest in one of the lower branches, a Kite nest on one of the long half-way-up branches, and a Baltimore Oriole nest containing five eggs *not more than four feet from the Kite nest.* Without difficulty

I could put my hands on both the Kite and Oriole nests at the same time. The Orioles did not scold or fly at the Kites, though the Mockingbirds sometimes did.

In another tree, a cottonwood that stood along the South Canadian River, we found a Kite nest with two eggs, a Mockingbird nest with four eggs, a Mourning Dove nest

Fig. 22. Mississippi Kite's nest in "shinnery" oak about six feet from ground; near Peek, Ellis County, Oklahoma.

with two young, and a two-storied Scissor-tailed Flycatcher nest with five eggs, all within a comparatively short distance of one another. When not disturbed, these several species got on admirably. When disturbed, the Scissor-tails and Mockers gave vent to their anger or excitement in attacks upon the Kites.

Now and then, even out in the open country, we saw a Scissor-tail in hot pursuit of a Kite. And one fine morning—one of those clear, windless mornings that linger in the memory—we saw a Kite dashing at a White-necked Raven while in turn being pursued by a Scissor-tail!

However gentle the Kite may be inherently, he puts up a fight on occasion. At nests holding eggs we were invariably scolded, sometimes by both parent birds, sometimes by a veritable *flock* of Kites. Now the trim birds dived at us repeatedly, screaming *phee-phew! phee-phew!* in our very faces. They did not, however, strike us. If we imitated the cawing of a Crow, they usually doubled their attacks, and not infrequently more Kites came from afar to join in the fray. Fresh eggs were not so vehemently defended as were much-incubated ones. Observing this phenomenon, I comprehended at last the mild fight put up by birds that were relining last year's nests.

Food.—In 1936 ten, and in 1937 six, adult Kite specimens were collected. The stomachs of all these were preserved and sent to Dr. Clarence Cottam of the United States Department of Agriculture's Bureau of Biological Survey. Dr. Cottam and his associates have furnished me with a detailed report on their examination of these specimens, assisting me further by preparing a list of common names of the insects found.

Fig. 23. Mississippi Kite, seven hours old. Drawn by author at Arnett, Oklahoma, June 18, 1936.

The ten 1936 specimens were examined by Mr. A. L. Nelson, the six 1937 specimens by Mr. L. W. Saylor. To these gentlemen and to Dr. Cottam we extend sincere thanks.

Since entomologists as well as ornithologists will be interested in the food habits of the Kite, we present the detailed report of Messrs. Nelson and Saylor below. From this we learn that the Mississippi Kite in western Oklahoma feeds practically exclusively on insects during May and June. Among these insects are grasshoppers and crickets of many sorts; ground, wood-boring, scrub, skin or larder, tiger, carrion, dung, diving, water scavenger, and May beetles; weevils, bill-bugs; mud-dauber, spider, paper, and solitary wasps, and other Hymenoptera; stink-bugs; hawk moths and other Lepidoptera; and a few Diptera (flies). Among these insects the most frequently preyed upon obviously are the camel or cave cricket, *Daihinia brevipes* (remains of which were found in almost every stomach examined), and various "common" grasshoppers such as *Melanoplus*. In not one of the stomachs was found trace of bird, mammal, or reptile. In one was the vertebra of an "undetermined fish." This is not the place, perhaps, for a discussion of the economic status of the insects consumed by the Kite. Some of them

no doubt are "good," some "bad." Game officials who in the past have sanctioned the killing of these so-called "Blue Darters" on the supposition that they feed on baby quail may well take note and revise their opinions. The Mississippi Kite is a harmless if not decidedly beneficial bird during the Quail's and Lesser Prairie Chicken's nesting season.

DETAILED REPORT ON STOMACH CONTENTS

1. Male, May 28, 1936: Fragments of 6 camel crickets, *Daihinia brevipes.*
2. Female, May 28, 1936: Fragments of at least 3 *Daihinia brevipes;* 1 Carabidae; vertebra of undetermined fish.
3. Male, June 10, 1936: 3 Acrididae; 2 dung beetles, *Phanaeus difformis;* 1 tumble bug; 1 *Canthon* sp.
4. Female, June 10, 1936: Fragments of Locustidae; 1 *Phanaeus difformis.*
5. Male, May 9, 1936: 4 *Daihinia brevipes;* 2 undetermined Acrididae; 1 *Phanaeus difformis;* 1 *Canthon* sp.; 1 Carabidae (trace); 1 Pentatomidae; 1 undetermined Hymenoptera (trace).
6. Male, May 24, 1936: Fragments of 9 *Daihinia brevipes.*
7. Male, June 12, 1936: 2 *Daihinia brevipes;* 1 Acrididae; 1 water scavenger beetle, *Tropisternus lateralis;* 1 Cerambycidae; 1 ground beetle, *Geopinus incrassatus;* 1 *Phanaeus difformis;* 1 Psammocharidae; 1 solitary wasp, *Odynerus* sp.
8. Male, May 14, 1936: 4 *Daihinia brevipes;* 1 *Phanaeus difformis;* 1 *Geopinus incrassatus;* 1 chinch bug, *Geocoris* sp.; 1 Sphingidae (adult); 1 undetermined Lepidoptera (adult).
9. Male, May 16, 1936: 7 *Daihinia brevipes;* 1 band-winged grasshopper, *Hippiscus* sp.; 1 carrion beetle, *Necrophorus* sp.; 1 May beetle, *Phyllophaga* sp.; 1 tiger beetle, *Cicindela* sp.; 1 *Canthon* sp.; 13 ground beetles, *Selenophorus* sp.; 9 ground beetles, *Triplectrus* sp.; 1 Staphylinidae; 1 Cerambycidae; 1 stink-bug, *Euschistus variolarius;* 1 plant bug, *Thyanta custator;* 3 assassin flies, *Dasyllus* sp.; 2 solitary wasps, *Stizus unicinctus;* 1 Sphingidae (adult).
10. Female, June 12, 1936: Fragments of 2 *Hippiscus* sp.; 2 short-horned grasshoppers, *Trimerotropis* sp.; 2 grasshoppers, *Melanoplus* sp. (different species); 3 Acrididae; 1 stink-bug, *Chlorochroa ligata;* 1 *Thyanta custator;* 1 stink-bug, *Peribalus limbolarius;* 3 *Necrophorus* sp.; 1 *Cicindela* sp.; 1 skin beetle, *Dermestes* sp.; 1 ground beetle, *Calosoma* sp.; 1 weevil, *Lixus* sp.; 1 bill-bug, *Rhodobaenus tridecimpunctatus;* 2 wasps, *Elis quinquecincta.*
11. Female, May 8, 1937: 12 leaf-legged bugs, *Leptoglossus* sp.; 2 *Euschistus* sp.; 3 Carabidae; 1 Hymenoptera; 1 Diptera; 1 Sphecidae; 73 *Melanoplus* (64 of them females!).
12. Female, May 8, 1937: 10 *Daihinia brevipes* (8 females), all in fair condition save that heads were well digested.
13. Male, May 14, 1937; 9 *Leptoglossus* sp.; 3 *Euschistus* sp.; 5 ground beetles, *Platynus* sp.; 1 painted-winged grasshopper, Oedipodinae; 2 Hymenoptera (of two genera); 1 Dytiscidae; 1 Pentatomidae; 45 *Melanoplus* sp. (at least 41 of them females).
14. Male, May 27, 1937: 1 *Cicindela* sp.; 5 *Daihinia brevipes;* 1 Oedipodinae; 1 Scarabaeidae; 1 Pentatomidae; 1 Formicidae.
15. Male, May 27, 1937: 1 *Cicindela* sp.; 2 *Euschistus* sp.; 4 stink-bugs, *Nezara* sp.; 2 *Calosoma* sp.; 1 Coreidae; 4 *Daihinia brevipes;* 1 robber fly, Asilidae; 7 *Melanoplus;* 1 Oedipodinae; 2 ground beetles, *Harpalus* sp.; 1 Curculionidae; 1 Vespidae.
16. Male, May 27, 1937: 1 Dytiscidae; 1 paper wasp, *Polistes* sp.; 2 bees (probably *Andrena* sp.); 1 Sphecidae; 1 dung scarab beetle, *Copris* sp.; 1 Asilidae; 2 *Nezara* sp.; 2 *Calosoma obsoletum;* 1 ground beetle; 1 *Amara* sp.; 1 scavenger beetle, *Hister* sp.; 1 bee, Halictidae; 1 *Melanoplus;* 6 *Daihinia brevipes;* 2 Oedipodinae; 2 *Euschistus* sp.

Ectoparasites.—Though I have handled and carefully examined sixteen adult specimens of Mississippi Kite I have yet to find upon one of them a hippoboscid fly, any sort of eye-worm, or any sort of mite.

Mallophaga, on the other hand, are sometimes present in considerable numbers. These I collected whenever possible, sending them to Dr. F. C. Bishopp, Entomologist in charge of Insects Affecting Man and Animals, of the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture. Dr. H. E. Ewing, of the Taxonomic Division of the above-named Bureau, has identified the specimens as follows: *Laemobothrion* sp., *Degeeriella fusca, Philopterus* sp., and *Kurodaia* sp.

Endoparasites.—The only endoparasites found in the alimentary tracts of specimens examined were tapeworms. These were identified by Messrs. E. Q. Price and Allen McIntosh of the Zoological Division of the Bureau of Animal Industry of the United States Department of Agriculture as *Choanotaenia* sp.

Future of the Mississippi Kite in Oklahoma.—In some parts of Oklahoma the Mississippi Kite is common today. Persons who live in Ellis County find it difficult to believe that throughout most of the United States the "Locust Hawk" is an all but unheard-of bird. No one in western Oklahoma therefore is disturbed at hearing that some zealous game warden has killed two or three hundred Kites, or that some egg collector from the East has taken dozens of sets of eggs in a single season.

Personally, I am not alarmed about destruction of the Kites or their nests by cattlemen, gunners, and Game Commission officials. Even the sportsmen, who are interested in saving baby Bob-whites and Prairie Chickens, know fairly well by this time that the Kite is not an enemy of game birds. *But about the professional egg collector I am alarmed.* Mississippi Kite eggs are known to be "good" eggs. They may be dirt-

Fig. 24. Mississippi Kite; drawn by author at Arnett, Oklahoma, May 16, 1936.

common in some parts of Oklahoma but they are rare and desirable elsewhere. They can be collected easily. Gathering them is an almost stupid business. So long as present-day methods of egg-hoarding and egg-exchanging continue, the Mississippi Kite is in

grave danger in Oklahoma. We read of Mississippi Kite nests found in other southern States, a hundred or more feet up in gum trees. Eggs in such nests are fairly safe from molestation. But eggs which can be taken from the little trees about Arnett are safe from no one.

I repeat, for emphasis: The Mississippi Kite is common today in many sections of western Oklahoma. The publication of this paper may cause many an enthusiastic eastern ornithologist to direct his steps westward in the hope of seeing a lovely bird of prey that has become all too rare throughout most of its range; at the same time it will expose the very birds I watched from day to day at Arnett to the unscrupulous egg collector. With an automobile, a light-weight step ladder and a boxful of cotton, any egg collector can go to Arnett today and gather in dozens of Mississippi Kite eggs without even scratching his hands on locust thorns! He can gather them in, hoard them, exchange them, have a great time gloating over them. With a dime here and a dime there he can put the farm lads to scouring the countryside for nests. For him, the rarer the Kite becomes, the better. For him, the sooner the Kite becomes extinct the sooner will he be able to command "fancy prices," the sooner a set of Kite eggs will bring a Crowned Eagle set in exchange, the sooner his fame as an "oölogist" will circle the globe.

The shinnery country of Ellis County is the Kites' happy hunting ground. Too, it is a stronghold of the rare Lesser Prairie Chicken, *Tympanuchus pallidicinctus*. Some measure of protection is afforded both these fine birds near Arnett today because a large part of the Davison Ranch is a State Game Refuge. But *no* Game Refuge is safe from an egg-hog. Silently he goes about his business of extermination, bland words on his tongue, an expression of innocence on his face.

Let this plea be a boomerang if it must, for I have collected many a set of eggs, among them those of the Mississippi Kite. But all sincere ornithologists want living birds to see and study, not stuffed skins and egg shells. How dismal to visit the shinnery country of Oklahoma in spring, feeling the morning sun on one's hands and face, but hearing no Prairie Chicken gobbling from a distant rise, and seeing no Kite at play among the clouds!

Cornell University, Ithaca, New York, January 10, 1939.

OBSERVATIONS ON RAPTORIAL BIRDS IN THE LAVA BEDS–TULE LAKE REGION OF NORTHERN CALIFORNIA

WITH ONE ILLUSTRATION

By RICHARD M. BOND

A previous article on the raptorial birds of the area indicated in the above title, by Joseph S. Dixon and the present writer (Condor, vol. 39, 1937, pp. 97-102), told of conditions in December, 1935, and April, May, June and September, 1936. Meadow mice and birds of prey were both then extremely abundant. On and near the cliff areas in the spring we found 5 pairs of Red-tails, a pair of Duck Hawks, 6 pairs of Prairie Falcons, a pair of Sparrow Hawks, about 300 Barn Owls old enough to fly, 25 or 30 adult Short-eared Owls, 4 pairs of Horned Owls (with at least 4 young out of the nest), and a pair of Burrowing Owls. On the main body of the Lava Beds National Monument we found 8 pairs of Red-tails, a pair of Bald Eagles (with 1 young), 2 pairs of Prairie Falcons, a dozen or more pairs of Sparrow Hawks and several Barn and Horned owls. Somewhere between 9 and 12 pairs of Marsh Hawks were nesting within 3 or 4 miles of the monument in the Tule Lake Refuge.

Further observations, while I was employed by the United States National Park Service, were made by me in this area, January 2-7, February 25-26, June 1-12, July 15-16, August 12, October 31-November 11, 1937, and March 28, 1938, or a total of 36 days. In the first week in January of 1937, meadow mice and hawks were abundant, but owls were somewhat rarer than during the previous winter. The greatest number of each species counted on any day of this period were: Goshawk 1, Red-tail 4, American Rough-leg 18, Ferruginous Rough-leg 1, Bald Eagle (adult) 5, Marsh Hawk 16, Prairie Falcon 3, Sparrow Hawk 1, Barn Owl (on cliffs) about a dozen, Horned Owl 2, Short-eared Owl 3. Not only were most of these birds concentrated in areas of *Microtus* abundance, but 34 Great Blue Herons were also observed mousing in a dry stubble field.

The night of January 5 about five inches of snow fell, and that and the following nights the temperature reached —10° F, and on January 7 it fell still farther, to —18° at monument headquarters. When I returned to the area February 25, I found that the cold weather had continued and that there had been a real blizzard a week or so before my arrival. Birds of nearly all kinds were rare. Meadow mice, still enormously abundant eight weeks before, were almost absent. Fresh workings of only one were found in several miles of walking, where on January 3 there had been many hundreds. Raptors had become much scarcer. Only 4 Red-tails, 2 American Rough-legs, 3 Ferruginous Rough-legs, 2 unidentified Rough-legs, 3 Bald Eagles and 2 Marsh Hawks were seen; 5 Barn Owls were scared from the east and west Petroglyph Cliffs; no Short-eared owls were seen.

It seems certain that the reduction in numbers of hawks and owls was largely caused by the dearth of mice (though 17 hawks and an adult Bald Eagle had been killed by members of the Biological Survey, the former for molesting quail at feeding stations, and the latter as a specimen); but it is not certain if the mouse reduction was caused by disease only, as seems often to be the case, or if enemies and inclement weather played important parts in the catastrophe. Water birds were beginning to return from the south at this time, and at least 10,000 snow geese arrived in one flock on February 25.

In June, meadow mice and raptorial birds were both extremely rare. On the monument proper there were 2 pairs of Red-tails instead of 8; one pair did not lay and the other raised only 1 young; the Bald Eagles' nest had blown down, and though a new one had been built, the eggs had been destroyed by an unknown agent; there were no Prairie Falcons, instead of 2 pairs, and 1 pair of Sparrow Hawks in place of a dozen

or more. (An Osprey, not previously reported, was seen over the monument by Mr. Elmer Aldrich.) Conditions on the cliff areas are shown in the following table.

	1936	1937
Red-tailed Hawk	5 pairs	3 pairs
Duck Hawk	1 pair	1 pair (not nesting)
Prairie Falcon	6 pairs	3 pairs
Sparrow Hawk	1 pair	none
Barn Owl	about 300 individuals	about 60–70 individuals
Short-eared Owl	25–30 individual adults	none
Horned Owl	4 pairs	3 pairs
Burrowing Owl	1 pair	2 pairs
Marsh Hawk (on refuge)	9–12 pairs	2 pairs
Totals:	about 380 birds	about 95 birds, a reduction of about 75 per cent

A cliff northwest of the monument (not mentioned in the previous article) had, in 1936, 5 nests of Red-tail, 1 of Prairie Falcon, and 2 of Horned Owl; in 1937, only 2 nests of Red-tail and 1 of Horned Owl.

It is difficult to explain the reduction of Prairie Falcon numbers, unless these birds in this region are more dependent upon meadow mice than is generally supposed, or unless it was simply a coincidence.

In mid-July birds of prey were still rare, and in mid-August the only ones that showed any increase were Turkey Vultures and Sparrow Hawks. At the latter time under the east Petroglyph Cliff I found dead, 1 adult and 1 nestling Prairie Falcon, 1 post-nestling Red-tail, and 2 adult and 2 nestling Barn Owls. All were too old to determine the cause of death, though some fresh .22 shells may have been connected with some of them.

Just after my August visit botulism became epidemic on the Tule Lake Refuge. By the middle of November some 7000 ducks and other water birds had died. The resident Biological Survey Biologist, Mr. Herbert H. Dill, informed me that large numbers of Turkey Vultures fed on the carcasses, along with Bald Eagles and Marsh Hawks. None of these was seen to be affected, but the young of a family of Duck Hawks apparently were attacked, and two were so weak that they were caught by hand and preserved as specimens; although *Clostridium botulinum*, type C, was not recovered from the carcasses, the symptoms were entirely typical. It is not known if the parents of this brood were the Petroglyph pair that had found a new nesting site, as seems quite possible, or a pair nesting at a distance that had been attracted by the food supply.

By the first part of November, there were many more raptors present than in June. There were about 25 Barn Owls and 4 Horned Owls on the Petroglyph Cliffs as well as 1 adult Duck Hawk (one day only) and a resident Prairie Falcon. Dead under the cliffs were 6 more Barn Owls, 2 young Prairie Falcons and a Horned Owl, all dead a month or more. From a dyke on the refuge I saw, all at the same time, 9 Marsh Hawks, 3 American Rough-legs, 2 Red-tails and 2 Prairie Falcons. A new record for the monument was a Pigeon Hawk (*Falco columbarius*) on November 8. Two immature Golden Eagles were also seen on the monument. One of these, or another, was subsequently killed by a trapper and nailed to his cabin under the east Petroglyph Cliff.

On my last visit to the Lava Beds, March 27, 1938, a pair of Prairie Falcons was seen on the Petroglyph Cliffs, and a pair of Red-tails.

BANDING

During the first part of June Mr. Elmer Aldrich, Student Assistant for the National Park Service, and I together banded all the nestling hawks that could be reached.

(Mr. Aldrich did the climbing and I gave him encouragement and supplied the rope.) Thirteen Red-tails in 5 nests, and 11 Prairie Falcons in 3 nests were banded. Of these, one Prairie Falcon and one Red-tail were later found dead under their respective nests. A Red-tail banded June 5, 1937, was shot near Merced, California, September 28 the same year. A Prairie Falcon banded June 6 was killed 81 days later, on August 26, at Horizon, Saskatchewan, and a couple of weeks later another was picked up dead about 100 miles away. These birds had traveled more than 900 miles northeast! Neither bird showed evidence of having been in captivity, and the extreme inaccessibility of the nesting sites, and the stringency of Canadian law, make it seem almost impossible that human agency could have been involved.

Two nests of Prairie Falcon were banded on that day, June 6, and our records unfortunately fail to show whether or not both the young were from the same nest. The adults at one of these nests were both remarkable. The female was the darkest of the species I have ever seen and was at first mistaken for a Duck Hawk. The male was the best and boldest flyer I have ever had the delight of watching. Over and over again he swooped, from a height of about 100 yards, within a foot or two of Mr. Aldrich's justifiably nervous head. The usual male will leave the defense of the young entirely to his mate and will often not come within a quarter of a mile of an intruder. This nest was about 5 miles from the monument.

FOOD HABITS OF HAWKS

Data for hawks in and near the Lava Beds, given herewith, are too few to permit of drawing very many conclusions as to species food habits. They simply show a few of the captures certain birds were able to make under the conditions of food and cover existing in the region under discussion, between December, 1935, and March, 1938. The term "Nest" as used below includes nesting sites that have become roosts for the adults after the dispersal of the young. Some of the food items recorded were picked up long before or after the actual nesting season. Further: (c)=seen capturing; (e)=seen eating or carrying; (n)=in nest; (u)=under nest.

Red-tailed Hawk (*Buteo borealis*):

Nest 1
- Citellus beecheyi douglasii (e) 1

Nest 2
- Dipodomys heermanni californicus (n) 1
- Microtus montanus montanus (n) 3
- Sylvilagus nuttallii nuttallii (n) 2

Nest 3
- Mustela frenata nevadensis (n) 1
- Marmota flaviventer flaviventer (n) 1
- Citellus beldingi oregonus (n) 1
- Microtus montanus montanus (n) 1
- Larus californicus (u) 1
- Fulica americana americana (n) 1
- Icterus bullockii (n) 1
- Pituophis catenifer heermannii (n) 1

Nest 4
- Marmota flaviventer flaviventer (u) 1
- Citellus beldingi oregonus (n) 1
- Dipodomys heermanni californicus (n) 1
- Pituophis catenifer heermannii (n) 1

Nest 5
- Lepus californicus wallawalla (n) 1
- Sylvilagus nuttallii nuttallii (n) 1

Nest 6
- Citellus beldingi oregonus (n) 1, (u) 1
- Lepus californicus wallawalla (n) 1
- Sylvilagus nuttallii nuttallii (n) 1, (u) 2

Nest 7
- Marmota flaviventer flaviventer (n) 1
- Domestic fowl (n) 2, (u) 3
- Phasianus torquatus (u) 7

American Rough-leg (*Buteo lagopus s. johannis*):
- Microtus montanus montanus (c) 1
- Lepus californicus wallawalla (c) 1, (e) 1 (carrion)
- Phasianus torquatus (e) 1

Ferruginous Rough-leg (*Buteo regalis*):
- Microtus montanus montanus (c) 5
- Lepus californicus wallawalla (e) 1

Bald Eagle (*Haliaeetus leucocephalus*):
- Colymbus nigricollis californicus (u) 1
- Larus californicus (u)
- Dafila acuta tzitzihoa (u) 2
- Fish (apparently Catastomidae or Cyprinidae) (e) 2

Marsh Hawk (*Circus hudsonius*):
- Microtus montanus montanus (e and c) 7
- Lepus californicus wallawalla (carrion) (e) 2

Lophortyx californica vallicola (stomach) 1
Zonotrichia leucophrys ssp. (c) 1

Prairie Falcon (*Falco mexicanus*):
Nest 1
Citellus beecheyi douglasii (u) 1
Citellus beldingi oregonus (u) 1
Anas platyrhynchos platyrhynchos (u) 1
Aphelocoma californica immanis (u) 1
Salpinctes obsoletus obsoletus (u) 1
Sialia currucoides (u) 2
Vireo sp. (u) 1
Sturnella neglecta (u) 2
Pipilo maculatus ssp. (u) 1
Nest 2
Otocoris alpestris merrilli (u) 5
Sturnella neglecta (u) 2
Carpodacus sp. (u) 1
Nest 3
Citellus beldingi oregonus (u) 7
Oxyechus vociferus vociferus (u) 1
Nest 4
Microtus montanus montanus (c) 1
Dafila acuta tzitzihoa (u) 2
Fulica americana americana (u) 2
Mareca americana (u) 1
Colaptes cafer collaris (u) 1
Otocoris alpestris merrilli (u) 1
Sialia currucoides (u) 2
Sturnella neglecta (u) 1
Euphagus cyanocephalus (u) 2
Nest 5
Marmota flaviventer flaviventer (u) 1
Phasianus torquatus (u) 1
Anthus spinoletta rubescens (u) 2

Duck Hawk (*Falco peregrinus anatum*):
Anas platyrhynchos platyrhynchos (u) 1
Phasianus torquatus (u) 1
Larus californicus (u) 1
Zenaidura macroura marginella (u) 1
Colaptes cafer collaris (u) 1
Salpinctes obsoletus obsoletus (u) 2
Sialia currucoides (u) 20 (approximately)
Sturnella neglecta (u) 2
Agelaius phoeniceus ssp. (u) 2
Xanthocephalus xanthocephalus (u) 1
Euphagus cyanocephalus (u) 8
Bombycilla cedrorum (u) 1
Carpodacus mexicanus frontalis (u) 1

Sparrow Hawk (*Falco sparverius sparverius*):
Microtus montanus montanus (c) 2, (e) 3
Sceloporus sp. (e) 1
Grasshoppers (c) many

Acknowledgments are due to the staff of the Museum of Vertebrate Zoology, where the owl pellet material was identified, particularly to Mr. Seth B. Benson and Mr. Alden H. Miller; also to Mr. Stanley G. Jewett of the Biological Survey, whose reference collection of birds was placed at my disposal for identification of avian material from in and under hawk nests.

A few comments on the above are in order. It will be noted that only one pair of Red-tails (nest 7) indulged in chickens and pheasants. Their nest was a few hundred feet from an inhabited dwelling, and was also close to the town of Tulelake where chickens are not rare. It seems possible that this pair of birds was so familiar with man and his works that they fearlessly turned to the slow and defenseless fowl in preference to perfectly available normal prey. Perhaps having learned to master the Rhode Island Red, they applied the same technique to the abundant pheasants, for which their neighbors have never acquired a taste.

Prairie Falcon nests 2 and 3 were on the same cliff, within about a quarter-mile of each other, facing in the same direction over identical terrain, yet the food habits of the two pairs were different, one pair going in for birds and the other mainly for squirrels. The Baldpate shown for Nest 4 was brought in during the duck epidemic and may have been a sick bird.

Marsh Hawks and Rough-legs were seen many times to make captures of small dark-colored prey in *Microtus*-infested territory, but it was rarely possible to identify the prey with certainty, even with glasses.

FOOD HABITS OF OWLS

Data about the owls are much more extensive than for the hawks. On August 12, 1937, I collected a gunny-sack full of owl pellet material under the east and west Petroglyph Cliffs. One hundred whole pellets taken at random were weighed, and the collection was computed to have comprised a total of 1382 pellets. Most of the mammals were iden-

tified and counted by means of the lower jaws only, though a goodly number of the skulls were saved as checks. Lower jaws of *Peromyscus crinitus* and *P. maniculatus gambelii* are not certainly distinguishable in most cases, so the skulls that contained cheek teeth were separated, and the jaws assigned in proportion. Most of the birds were identified by means of skulls, though humeri and tarsometatarsi were also used; in three or four cases other parts of the skeleton had to be relied on. The following 3391 items were identified:

	Number	Per cent of total items
Mammals:		
Sorex vagrans amoenus	1	.03
Sorex merriami (2nd and 3rd from California)	2	.06
Mustela frenata nevadensis	1	.03
Perognathus parvus mollipilosus	38	1.12
Dipodomys heermanni californicus	25	.74
Reithrodontomys megalotis ssp.	22	1.62
Peromyscus crinitus ssp.	17	.50
Peromyscus maniculatus gambelii	330	9.83
Neotoma cinerea ssp.	3	.09
Microtus montanus montanus	2796	82.45
Lagurus curtatus ssp. (probably L. c. artemisiae, and if so the 2nd from California)	1	.03
Mus musculus ssp.	26	.77
Lepus californicus wallawalla (young)	3	.09
Sylvilagus nuttallii nuttallii (young)	3	.09
Totals	3301	97.34
Birds:		
Podilymbus podiceps podiceps	1	.03
Erismatura jamaicensis rubida	1	.03
Phasianus torquatus ssp.	3	.09
Rallus limicola limicola (first record for Tule Lake basin)	1	.03
Porzana carolina	1	.03
Fulica americana americana	6	.18
Oxyechus vociferus vociferus	1	.03
Tyto alba pratincola (young)	1	.03
Otocoris alpestris merrilli	9	.27
Petrochelidon albifrons albifrons	1	.03
Telmatodytes palustris plesius	6	.18
Sialia currucoides	6	.18
Passer domesticus domesticus	1	.03
Icterid (Xanthocephalus xanthocephalus?)	1	.03
Icterid (Agelaius phoeniceus ssp.?)	1	.03
Icterus bullockii	1	.03
Euphagus cyanocephalus	12	.35
Molothrus ater ssp.	4	.12
Passerculus sandwichensis ssp.	2	.06
Spizella breweri breweri	1	.03
Spizella sp.	2	.06
Totals	62	1.83
Reptiles:		
Pituophis catenifer heermannii	1	.03
Sceloporus sp.	2	.06
Totals	3	.09
Insects:		
Grasshoppers	20–30	
Total (for purposes of calculation)	25	.74
Totals	3391	100.00

The accompanying illustration (fig. 25) shows some of the jaws that were counted. All the *Microtus* jaws would not fit on the largest piece of black cardboard I could find, and the left-overs are piled on top of the others. Approximate average weights of most of the prey species are known, and from them it can be calculated that the owls had eaten about 300 pounds of rodents, including about 284 pounds of *Microtus*, and about 13½ pounds of birds.

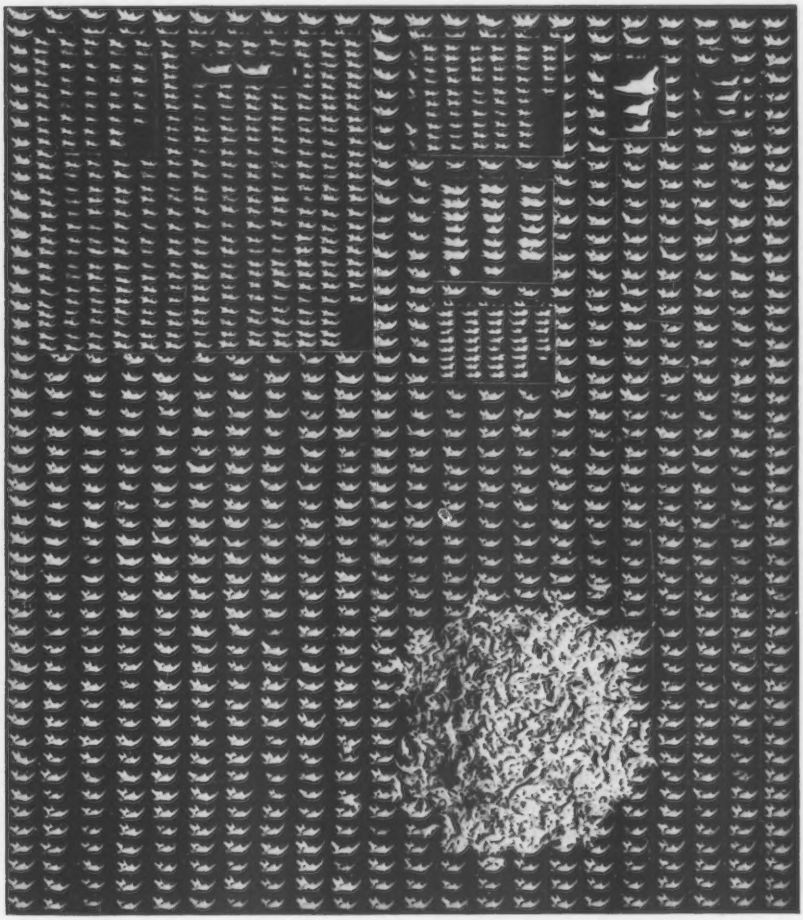

Fig. 25. Jaws of some of the mammals from owl pellets collected August 12, 1937. The largest piece of black cardboard obtainable would not hold all 2796 jaws of *Microtus montanus*, and the excess is piled at the lower right. The large square, upper left, is jaws of 347 *Peromyscus*, and on it jaws of 26 *mus* and 3 *Neotoma*. Farther to right are *Reithrodontomys* (upper), *Dipodomys* (center), and *Perognathus* (lower). Still farther to the right are 3 jaws of young *Sylvilagus* and 3 of younger and smaller *Lepus*.

Picked up along with the pellets, and apparently dropped by the owls, were remains of: *Lasiurus cinereus* 1, *Dipodomys heermanni californicus* 1, *Lepus californicus wallawalla* 2, *Numenius americanus* 1. The bat and curlew came from under the same Horned Owl roost, though Barn Owls lived so near that they may have been the captors.

When the pellets were collected, only those were taken that seemed, on the basis of state of preservation, to have been cast later than the previous winter. The very large percentage of meadow mice found make it seem almost certain, however, that a large part of those gathered actually dated at least from the previous fall and early winter, when both owls and *Microtus* were abundant. In this case the pellets must have represented a part of the meals of about 4 to 12 Horned Owls (*Bubo virginianus occidentalis*) and 30 to 100 Barn Owls (*Tyto alba pratincola*).

On November 5, 1937, 382 pellets were collected. These were all fresh, dark-colored, and covered with a varnish-like coat of dried mucous, so that it seems certain that they were all deposited later than August 12, especially as all fresh material seen on that date had been taken. There were apparently about 4 Horned Owls and about 25 Barn Owls on the cliffs during this time, so that the pellets collected (since pellets are produced at the approximate rate of one per owl per day) account for only about one-sixth of the food eaten. The 994 items identified were:

	Number	Per cent of total items
Mammals:		
Perognathus parvus mollipilosus	18	1.81
Dipodomys heermanni californicus	3	.30
Reithrodontomys megalotis ssp.	27	2.72
Peromyscus crinitus ssp.	16	1.62
Peromyscus maniculatus gambelii	201	20.22
Microtus montanus montanus	676	68.01
Mus musculus ssp.	6	.60
Lepus californicus wallawalla (young)	2	.20
Sylvilagus nuttallii nuttallii (adult)	1	.10
Totals:	950	95.57
Birds:		
Podilymbus podiceps podiceps	1	.10
? Dafila acuta tzitzihoa	1	.10
? Lophortyx californica vallicola	1	.10
Fulica americana americana	1	.10
Limnodromus griseus scolopaceus	1	.10
Ereunetes mauri	2	.20
Steganopus tricolor	1	.10
Otocoris alpestris merrilli	3	.30
Petrochelidon albifrons albifrons	1	.10
Anthus spinoletta rubescens	1	.10
Passer domesticus domesticus	1	.10
Sturnella neglecta	1	.10
Xanthocephalus xanthocephalus	3	.30
Icterid (Xanthocephalus?)	1	.10
Agelaius phoeniceus ssp.	4	.40
Euphagus cyanocephalus	2	.20
Molothrus ater ssp.	2	.20
Passerculus sandwichensis ssp.	16	1.62
Passerine (very young; Icterid?)	1	.10
Totals:	44	4.43
Combined totals:	994	100.00

Under the roosts were found remains of *Neotoma cinerea* ssp. 1, *Lepus californicus wallawalla* 4, and *Sylvilagus nuttallii nuttallii* 1.

EFFECT OF PREDATION BY HAWKS AND OWLS

Unfortunately, results of the predation by the raptorial birds are by no means so clear as would at first sight appear. The birds oftenest killed by hawks are apparently *Sialia currucoides*, 24 (out of 93 bird records in the food); *Phasianus torquatus*, 10; *Euphagus cyanocephalus*, 10; *Sturnella neglecta*, 7; and *Otocoris alpestris merrilli*, 6. Other species occur as less than 5 per cent of the food items. Birds occurring as more than 5 per cent of the 106 items from owl pellets are *Passerculus sandwichensis* ssp., 18; *Euphagus cyanocephalus*, 14; *Otocoris alpestris merrilli*, 12; *Fulica americana americana*, 7; *Telmatodytes palustris plesius*, *Sialia currucoides*, and *Molothrus ater* ssp., each 6. The Cowbird is not particularly common, and the abundance of the Marsh Wren is not known, but all the others vary from common (Coot, Meadowlark, Mountain Bluebird) to exceedingly abundant (Brewer Blackbird), and it is quite clear that none of the species is endangered, or probably appreciably reduced in numbers, by either the hawks or owls. Resident people reported seeing hawks kill many pheasants during the cold spell of January-February 1937; but later in the year the pheasants seemed about as abundant as ever, which is a strong statement, since the pheasant population in the Tule Lake basin appears to be denser than in many of the famous pheasant areas of Oregon and Washington.

The effect on the mammals, especially the meadow mice, may be considerable, or it may be very slight. In the fall of 1936, hunting over the 100 square miles of the old lake bed, there must have been not far from 1000 hawks and 1000 owls, and it seems likely that about 2000 meadow mice a day were killed by the birds. Assuming (as is not unreasonable from various observations) that a pair of adult *Microtus* produce 5 young every 45 days, or .11 young per day, we should need a breeding population of only 36,364 adult mice to supply the 2000 eaten daily by the hawks and owls. On the other hand, late fall seems to be a very low point in the breeding cycle of meadow mice, so that the assumed rate of reproduction is probably much too high. Perhaps 363,640 adults would be needed. Moreover, several non-raptorial birds, such as shrikes, gulls, herons, ravens, and predatory mammals from shrews to coyotes, are also at work, and perhaps eat as many mice as the raptors. Thus there would be required 727,280 adult *Microtus*, which amounts to a population of only about 12 mice per acre, including the young not yet eaten. There were actually many more than this on *some* acres, but I have no idea what the average for the whole basin was, nor what is the actual net reproductive rate of the mice, nor the actual age composition of the population, nor the amount of predation by other microtophagous creatures. Indeed, even the guesses for numbers of raptors present and number of mice eaten daily may easily be 50 per cent in error.

Such arithmetical juggling as the above shows, I think, quite clearly that it would be easy on the basis of quite reasonable assumptions, to "prove" that the raptorial birds were having no appreciable effect on the rodents, and equally easy, by varying the assumptions a little, to "prove" that the birds are saviours of the local agricultural populace. Far more important, it seems to me, such figuring shows how woefully little we know of prey-predator relationships in general, and what they mean to the predators and to the various categories of prey.

Until such knowledge is obtained, and probably afterward, I will continue to contemplate with much spiritual pleasure the continuing process of a large number of noble hawks and owls (to which I am greatly attached) busily consuming an even larger number of meadow mice (to which I am relatively indifferent), on and about the Lava Beds National Monument.

Santa Barbara, California, January 15, 1939.

MORE OBSERVATIONS ON THE NESTING OF THE ALLEN HUMMINGBIRD

By ERNEST I. DYER

On reading Mr. Robert T. Orr's excellent article on the nesting of an Allen Hummingbird (Condor, vol. 41, 1939, pp. 17-24) the writer was prompted to review his own notes, made at about the same time, on the nesting of a bird of the same species (*Selasphorus alleni*) at his home in Piedmont, about 15 miles east of, and 300 feet higher than, the scene of the first bird's activities.

Although, geographically, the two sites are not far apart, one should bear in mind the essential truth of the remark attributed to the late President Wheeler of the University of California, that there are, in this state: "49 'door-yard' climates within 49 miles of any given point," and that the area about the writer's home is one from which the primitive, natural growth has not yet entirely disappeared.

The two sets of observations were independently made without the knowledge on the part of either observer that the other was similarly engaged. As will appear later, the two birds showed both parallelisms and divergencies in their behavior; but a complete analysis of the situations thus created will not be attempted here, because the writer is not a technical student of bird habits, merely one who is interested in their companionship.

On June 1, 1938, a female Allen Hummingbird was seen occasionally fluttering about the end of a drooping branch of a live-oak (*Quercus agrifolia*) growing close to the north wall of the house, about on a level with the sill of a large window at the stair-landing. During the next day or so it was seen that this bird was placing nesting material at this point and a filmy platform could be descried. She appeared to work only in the early forenoon and then only in casual fashion, sometimes not being seen for an hour or more in the vicinity of the nest. Little progress was made on the nest until June 7, when she became more actively engaged. Arrangements were then made to take colored motion pictures with a 4½-inch telephoto lens from the stair-landing, the camera being placed about 9 feet from the nest and at a little higher elevation. (It could not be used any nearer because the lens would not focus sharply on objects closer than 8 feet.) The taking of notes at somewhat irregular intervals began at this time, and it was anticipated that a complete pictorial record could be obtained to accompany them, covering the whole cycle; but this was not to be.

It was found that a single leaf, to the stem of which the nest was attached at one point, obstructed the camera's "view"; so an arrangement was rigged up, consisting of pruning shears lashed to the end of a bamboo pole, with a cord running through eyelets by which the shears could be worked. This clumsy implement was used to cut off the leaf, a rather ticklish operation, at 7 feet distance, without injuring the nest or bird.

However, while the bird was away for more nesting material, the affair was put into operation; but before anything could be accomplished, she returned, buzzed in my face for a few seconds, then plumped herself firmly in the nest while the shears were still in contact with it. Her body must have been actually in contact with them. At this point the notes say:

> Compare Dawson's statement (Birds of California) in reference to this species: ". . . of our seven species, Allen's is consistently the most retiring and secretive, as well as the wildest when found."

The bird did leave the nest before the operation was finished, but she returned immediately afterward and resumed work as if nothing had happened. The notes now say (still under date June 7):

It was possible to view the building operation from a distance of about 6 feet, and it was at once seen that, at the present stage of construction, when the nest has but a slight depression representing the future bowl, the bird shapes the outside by sitting inside and reaching out and under the nest with her bill and pressing the latter against the outer wall while drawing the bill upward. Further, to my astonishment, it was seen that, during this action, the tongue was fully extended and was used in a manner which suggested irresistibly that the bird was applying saliva, or perhaps some adhesive secretion, to the exterior as a binder or cementing material. She also rubbed her cheeks (as a brush?) around and a little below the periphery, heightening the suggestion.

Still later, on returning and carrying nothing visible to the eye, she entered the nest, raised her head, opened her bill widely and made what appeared to be an effort to disgorge something. However, I could see nothing issuing from her mouth; but as soon as the action ceased, she immediately applied her bill and tongue to the exterior of the nest as already described. As there would seem to be no particular object in returning to the nest carrying nothing, this action not only supports the inference of the use of binding material, but suggests that she brought in her mouth something especially adapted to exterior application. One can only speculate at this point. She might have had a mass of cobwebs in her gullet, there to be treated with some secretion of her own, or she may have obtained some glutinous or pitchy matter of vegetable origin.

About 7 feet from her nest there is a nest of the bush-tit from which the brood has left. She frequently uses this as a source of supply. It would seem to contain everything she needs, but her visits elsewhere are more frequent and she can be seen carrying spider-webs, some of which become entangled with her head and the surroundings of the nest. At present she is giving most of her attention to the outside of the nest, applying the spider-webs there; but she also stabs the parapet of the nest with her beak with nothing visible in her bill. (Injecting a binder or merely compacting the structure?)

(The notes are rather full and, although the observation periods were irregularly spaced, they tell the full story, including speculations made at the time: So excerpts from them will form the bulk of this article.)

June 8. (Sunrise 4:47; sunset 7:30.) The Allen hummingbird's nest is growing slowly. The bird works actively for half an hour to an hour, then absents herself for like periods. Most of her attention is still given to the exterior, and the bowl is still rough and irregular, although she occasionally shapes it by bobbing up and down in it and "shimmying." This perhaps also compacts it.

She was seen again today apparently disgorging something over the edge and down the side of the nest, following the action by rubbing with her bill and tongue; but nothing could be seen issuing from her mouth. She gives little heed to spectators, not allowing her work to be interfered with, although she occasionally comes to peer at them.

The male has been seen only once in the vicinity of the nest, and then he did no work, buzzing off shortly. At present the nest, in horizontal plan, is elliptical in form, not circular.

6:10 p.m. Mr. Grinnell, after seeing the bird at work this afternoon, for one brief interval, suggests that, if the bird is using something to bind the structure, it may be plant nectar—possibly from the *Diplacus* (monkey flower) of which the bird is very fond. There is a lot of this shrub growing wild in the garden and this is the time of its maximum bloom.

June 9. At about 5:45 a.m. the Allen hummer was not working; but I watched only a few minutes. A few glances at the nest between then and 6:30 a.m., when I left, failed to reveal her presence.

On my return about 4 p.m. it was found that she had raised the parapet of the nest in the meantime, perhaps half an inch, with what looked like cotton irregularly applied, leaving the rim and the enclosed bowl in rough condition. She was not seen working later than this today, but the nest was not watched closely.

June 10. Noon. This has been an overcast, chilly morning. The hummer has been observed a few times working on the nest and seems to show increasing tendency to sit in it longer after each addition of material or period of active shaping.

The walls of the nest are beginning to show what ship-builders call "tumble-home," that is, they are inclining in toward the center as they rise in height, so that the inside diameter of the cup at the top is less than at the bottom.

June 11. 9 a.m. The hummingbird is at work now, "licking" the outside of the nest and jiggling up and down in it.

2:30 p.m. The Allen hummer is putting "moss" (an alga?) on the outside of the nest. I watched her at 5 feet distance with 3x glasses. She still gets some material from the bush-tit nest. She sat quietly in the nest and began to doze, her *upper* eyelids gradually creeping down to meet the lower. While dozing, the male appeared, buzzed about for a few seconds, inspected me, departed.

The female slackened work about 5 o'clock, visiting the nest rarely after that. She does not stay in it at night.

June 12. The Allen hummer worked in casual fashion, mostly applying material to the outside of the nest and compacting the structure, which is now more nearly circular in plan, but looks "too small" for the bird, as most of her is visible when she sits in it. The parapet does not appear to have been raised during the day.

June 13. 9 a.m. At about 8:15 a.m. it was seen that the hummingbird has one egg in the nest, but she continues to work on the outside, probe the parapet and "jiggle." No egg there, 6 p.m., 12th She also sits quietly on the egg for several minutes at a time, but does not hesitate to leave it exposed for long periods.

9:20 a.m. She has just attacked a brown towhee—not actually striking him—but buzzed about him threateningly until he left the tree.

The hummingbird's attitude toward the nest during the rest of the daylight hours seemed little changed by the presence of the egg: New material was added and there were frequent long absences. Between 5 and 7 p.m. the nest was observed fairly often, but the bird was seen to visit it but once. At the time, it was thought that this meant that she would not cover the egg during the night; but an observation made at 11 p.m. revealed her presence in the nest.

The question now arises as to whether night occupancy constitutes "incubation" and, if not, when does that action begin?

June 14. (Sunrise 4:46; sunset 7:33.) At 5:25 a.m. the hummingbird was sitting in the nest. At 6 she was away, and it was seen that there was still but one egg. Between that time and 8 a.m. she was seen to add more material from the bush-tit nest and absent herself for periods of several minutes. Only one egg.

The outside of the nest is, at present, decorated with an alga—the fibrous sort, such as grows in pools. From the side from which observations are made (S.W.) only one flake of lichen can be seen. (A nest of the Allen hummingbird in Redwood Canyon, which is being watched, is liberally spotted with lichen, the effect being—after the nest is once located—to make it conspicuous instead of the opposite.)

During the rest of the day the bird here was frequently away from the nest for extended periods, but occupied it during the night.

June 15. At 6:25 a.m. the hummer was in the nest. At 7:30 she was out and two eggs were visible. Therefore one day intervened between the laying of the eggs.

11 a.m. The hummer seems to alternate incubation with continued work at the nest—still adding material to it. There are now a half dozen or so conspicuous flecks of lichen on the S.W. side (toward the window). (The Redwood Canyon nest is much greater in bulk. It also has a "tumble-home" to the sides and the one youngster in it is secured against falling out.)

Nothing in the foregoing notes gives us with certainty the precise time at which either of the eggs was laid, but it seems fairly safe to assume that one of them received two nights of incubation before the other was laid, and perhaps two days may be counted as its incubation period to date. But there is nothing certain about either supposition.

June 16. The Allen hummingbird continued to incubate and add to the structure. The material included spider-webs, lichens and something looking like cotton.

(Little attention was given to the hummer's affairs on this day because the thrashers were having trouble with the Argentine ants' swarming over their nest and young and crawling in the eyes of chicks and parents. This involved removing parents and all, spraying nest and surroundings, and restoring the occupants, of which one had disappeared.)

June 17. At 6 a.m. the hummer was on her eggs. At 7:45 the hummer was seen to add material to the parapet of her nest (presumably raising it?). The outside is now fairly well covered with lichens. She still compacts the structure by "jiggling." It is possible to distinguish between this action and that of rubbing herself down upon the eggs.

June 18 and 19. The hummer on both days added material to the nest, both outside and inside. Outside mostly spider-webs; inside cottony stuff, usually inside the rim as if increasing the bulge inward there. The exterior is now well covered with lichen and "moss." She continues to drive other

birds out of the tree, having now added a thrasher and a house wren to her list of undesirables. Unlike the thrashers, she leaves the eggs uncovered frequently.

June 20 and 21. During this period affairs remained static. The hummer continued to add material to the nest occasionally.

June 22 to 25, incl. I was absent during this period, but Julio [my man-of-all-work] says that the Allen hummer was seen to add material to its nest.

June 26 and 28. During this period I was frequently away for several hours at a time. Allen hummer still incubating, but not infrequently leaving the nest for a minute or two. The male was seen for the third time near the nest for a few seconds.

There is no certainty that the male hummer referred to in these notes was the mate of the nesting bird. No records were made of the latter on June 29 and 30. The notes continue:

July 1. About 9 a.m. I looked into the hummer's nest for the first time today. There was at least one chick. I saw none yesterday. The first egg was laid on June 13, the second on June 15. Dawson says that, counting from the laying of the second egg, incubation lasts 12 days. On this basis, one egg should have hatched on June 27.

There is an implication here that either the first egg receives so little incubation, or that the second is so much "easier to hatch," that both will hatch on the same day, notwithstanding that, as he says, they are laid on "alternate" days. (Dawson, *op. cit.*, p. 928.) If by being "deposited on alternate days" he means that no egg is laid the day following the laying of the first, this agrees with the above observations, but not with Orr's. The implied hatching of both on the same day agrees with Orr's findings, but not with the writer's. The former found a period of 15 days.

If we take Dawson's starting point of reckoning: The laying of the second egg, the first Piedmont egg hatched in 16 days, and the second in 17, as witness the following excerpt:

July 2. The hummer now has two chicks in the nest this morning.

The writer is not informed, unfortunately, whether or not there is any agreement amongst ornithologists as to what behavior on the part of the bird shall be considered as constituting incubation and fixing the time from which reckoning shall be made. He doubts very much that birds will allow themselves to be confined within the framework of a rigorous mathematical formula and feels that, as shown by the two cases under consideration, no specific incubation period can be assigned to any free-living, wild bird. It seems only reasonable that, in the case of the Piedmont bird, the two nights of sitting on the first egg and the two days of irregular occupancy of the nest which followed, must be given some weight if the object is to determine the actual time required to hatch the eggs, and not a conventional "incubation period." In this case, therefore, the actual period during which the eggs were being subjected to the heat of the mother's body would appear to be something of the order of 17 or 18 days for the first egg and probably 17 for the second.

The notes for July 2 continue:

I began a continuous watch of the Allen hummer lasting from 3:30 to 4:54 p.m. The log follows:

3:30. Female on the nest after a short absence. (Male was not seen at all during this period.)
3:40. After a short absence—time of leaving not taken—she returned and fed both chicks, each being fed alternately, with strict impartiality, twice.
3:45. She flies from the nest.
3:48½. Returns, but does no feeding.
3:56. Flies away again.
3:59. Returns, but does no feeding. As before, covers chicks immediately—in fact lands *in* the nest.
4:06. Leaves again.
4:11½. Returns, feeds both chicks while she sits on the rim of the nest. At first feeding observed, the bill was thrust deeply down the throat of one young and not so deeply down the other. This time the "skewering" was less deep.

4:29½. Leaves again.
4:32½. Back in nest again—no feeding.
4:42½. Leaves.
4:46. Back in nest again—no feeding.
4:52. Away again.
4:53. Back—feeds both.

This ended the period of continuous observation, but she was seen to feed both again at 5:15—no observations having been made in the meantime.

At no time during this period was it possible to see anything in her bill at 6 to 8 feet distance using 3x glasses. Feeding was apparently by regurgitation, the action being slow and deliberate, requiring 20 to 30 seconds to feed the two chicks.

It will be noted that she made two or three trips abroad between feedings—presumably to get enough food to feed both and perhaps to allow partial digestion to take place. [This comment does not allow for feeding herself—an oversight.] She did not feed them except immediately on returning from an absence, that is, after one feeding she had to go away for more food; so apparently the period during which the food was subjected to the action of her own digestive apparatus (if any such action occurred) could not have exceeded the length of her absences. (This is pure speculation based on insufficient material.) At no time was she seen to add to the nest structure.

Yellow-jackets are occasionally seen buzzing about the nest, but not landing on it, seeming to be more interested in the nearby leaves. Hence, if this bird used any adhesive material in binding the nest structure, or applying the outside covering, it probably was not the nectar of flowers.

July 3. A motion picture was taken of the Allen hummer feeding her young at 4 p.m. Only one chick was seen to respond and it may be that one is dead or missing. At the time yesterday's record was made it was seen that one chick was smaller than the other. When she returns from an absence there is usually an accumulation of pollen on her mandibles. In feeding the chicks, much of this is wiped off.

July 4. Absent most of the day. Hummer was seen feeding *one* chick before I left.

July 5. The Allen hummer was observed a few times only. Each time she returned from abroad—except when she immediately sat in the nest—she reached down into it as if to feed a young bird, but there seemed to be no response; she then entered the nest and sat there.

July 6. The hummer continued to sit in the nest, absenting herself occasionally and, on returning, was not seen to feed her chicks, although she made the same futile gestures recorded above. This was during the forenoon and part of the afternoon.

About 4:30 p.m. I reached down from a window above and parted the leaves above the nest with a fishing rod. The parent had just left. All I could see at about 8 feet distance was a dark blotch in the bottom of the nest and nothing moving. I got a long ladder and went up to investigate, finding both chicks dead. One was completely desiccated and about the size of a blue-bottle fly. The other, somewhat larger, had not yet stiffened. It would appear from her actions up to this time that the mother bird has been unable to comprehend that her offspring are past all aid. It is thought that the larger chick died last, and on the 5th. I removed both. She was not again seen at the nest, even up to 10 p.m.

July 7. The hummer was not seen to visit the nest all day; but at about 3 p.m., as three of us were looking at the nest from the landing, two hummers (species unidentified) skirmished through the nest tree and quickly disappeared. (This female and mate renewing courtship?)

There is no further notation on this subject until:

July 10. Allen hummers are occasionally seen in the vicinity of the abandoned nest, but not seen to enter it. Hummers are as numerous here now as I have ever seen them, perhaps more numerous. They are all Annas and Allens and seem to be "all" females or immatures.

Up to the present date the nest has remained vacant. It is being left there in order to determine whether it shall be used again this year, as is often the case, at least as a base.

One circumstance during the closing scene perhaps deserves further emphasis and that is that the parent undoubtedly tried to feed the dead chicks, and that repeatedly. Such an act is completely at variance with the generalization made by N. Tinbergen, Lector in Experimental Biology, University of Leyden (Bird-Lore, vol. 40, November-December, 1938) in the article entitled "Why Do Birds Behave as They Do?" in which

he cites (p. 391) experiments with young cuckoos as showing "that the parents' feeding behavior is released only by gaping young in the nest," and later in the same paragraph, he says that he has taken for an example a "Cuckoo-in-the-nest, but the conclusion about the parents' behavior holds true for all birds that feed their young." In other words a parent bird is moved to feed its young only by that young bird's opening its mouth! An extraordinary statement which, to refute, will lead us too far from the hummingbirds; but, although the present writer may have misinterpreted the behavior of the female hummer, he can not forbear mentioning the fact that, in the case of *every one* of the 15 or 20 nests of the California Thrasher which he has had under observation at his home, at "reading distance," there have been innumerable instances of one or the other of the parents' persistently trying to induce a totally unresponsive chick, by cluckings and bill-proddings, to open its mouth to receive food.

Piedmont, California, January 28, 1939.

SEA BIRDS FOUND FAR INLAND IN ALASKA

By OTTO WILLIAM GEIST

On September 21 or 22, 1937, an apparently immature Crested Auklet (*Aethia cristatella*) flew against the radio antenna of the Government Radio Station at Nulato on the Yukon River, Alaska. Mr. F. Alba, who worked near-by, picked up the bird, saved its skin, and brought same to me on October 23, 1937. Mr. O. J. Murie of the U. S. Biological Survey identified it for me. Nulato is rather far inland from the sea. The nearest point on Norton Sound, Bering Sea, in a straight line and leading over fairly high mountain ranges (the highest are about 3500 feet in altitude according to Mr. S. E. Robbins, pilot for the Pacific Alaska Airways), is about 85 miles. Following the winding valley of the great Yukon River from its north mouth to Nulato, however, the distance at once increases to about 580 miles.

Most likely, weather conditions have a great deal to do with such unusual flights as this. I contacted Mr. R. Frost, Chief of the Fairbanks Government Weather Station, who furnished me with the following data pertaining to the particular days during which the flight must have been made.

"There is enclosed a summary of the weather conditions that prevailed over the lower Yukon river country last September. As you will note, only scant information is available. The lower Yukon region is so large and we receive so little information from there that it is difficult to prepare a general summary of the weather conditions for this region. I doubt if the summary enclosed will be of much assistance to you; however, it contains all the information that is available."

Weather Summary for the Lower Yukon and Kuskokwim river regions from September 18 to 21, 1937, inclusive: "During the second week of September a pronounced storm center moved eastward across Bering Sea and on the 16th it was located a short distance southwest of the mouth of the Kuskokwim River. The storm area caused unsettled weather throughout the lower Yukon and Kuskokwim river regions. Surface winds were light variable. Moderate to fresh easterly winds prevailed aloft at both Fairbanks and Nome. Stations in this area reported heavy low stratus clouds with rain and fog. Fair weather prevailed in the Seward Peninsula as well as in the region around Fairbanks. These weather conditions continued through the 18th, and for the next week fair weather prevailed. Early morning fog was reported at some stations along the lower Yukon River. The surface winds continued light and variable while moderate westerly winds prevailed aloft. No weather reports were received from points along the coast of Norton Sound.

"No precipitation or fog was reported at St. Paul Island during the entire period. Up to the 18th the winds at St. Paul were light but on the 19th they increased and strong southeast winds were reported. On the 20th and 21st the winds shifted to northeast and increased to gale force. Very little wind was reported at Nome during the period. On the 18th the maximum velocity recorded was 11 miles per hour from the west. Light variable winds were recorded during the next week. On the 21st the maximum velocity was only 10 m.p.h. from the southwest. The winds aloft at Nome were moderate westerly. At Fairbanks light to gentle variable winds were recorded except on the afternoon of the 19th when moderate southwesterly winds prevailed. The maximum velocity on that date was 18 m.p.h. from the southwest.

"The lower Yukon and Kuskokwim region includes a vast territory from which few weather reports are obtainable. There are no weather stations along the Yukon River below Nulato, and no weather reports were received from stations along the vast coast of Siberia or along the east coast of Norton Sound during the period in question."

(Signed) R. L. Frost,
Asst. Meteorologist.

In order to get a still closer check on the weather situation during the flight period, I contacted Mr. O. K. Anderson, in charge of the weather mapping at the Fairbanks Weather Station. I quote herewith in part the information he was able to furnish me for the period in question.

"As stated by Mr. Frost, our surface weather reports from the Seward Peninsula and Norton Sound area are of the sketchiest, and those we do receive are at infrequent intervals. Also, coded reports used for map preparation and analysis from this area are inadequate for comprehensive study.

"Detailed analysis of available surface and pilot balloon reports for the Norton Sound and Seward Peninsula area for the period September 15 to 23, 1937, indicates a period of generally unsettled weather, with surface winds generally northerly, with an hourly velocity of near 10 miles per hour. The weather for the entire area was under the influence of a series of waves, moving along a quasi-stationary front, extending from the northern coast of Siberia to north of Pt. Barrow. This wave formation acted as a series of separate disturbances, moving from the Siberian coast westward, and affecting the entire eastern Alaskan coast. Reports from Nulato show the occurrence of light to moderate fog on all reports received from September 15 to 17, and there is a strong probability that this same condition existed on the lower Yukon during the same period."

(Signed) O. Kenneth Anderson,
Asst. Meteorologist.

This brings another similar incident to my mind when during the first week in November, 1932, several Fork-tailed Petrels (*Oceanodroma furcata*) were carried during heavy storms as far inland as Curry Station, on the Alaska Railroad. The birds were found dead near the government hotel by employees who did not recognize them, but brought them to Mr. A. B. Cummings, the manager of the hotel. About three weeks later during a visit to the hotel, while discussing birds with Mr. Cummings, he mentioned the extraordinary incident and very carefully described the birds to me. Unfortunately, the birds were not saved, but from the excellent description, they could have been hardly anything else but Fork-tailed Petrels.

After being driven, perhaps by storms, that far inland, the birds very likely had become not only lost, but were exhausted and hungry as well. Alighting in the shelter of the high hills at Curry, they rested in the snow but soon froze to death. The distance from Curry to the nearest salt water at Knik-Arm in Cook Inlet (via the Alaska Railroad) is 80 miles. From the nearest point in the Bering Sea region due west in an airline to the mouth of Black River, the distance is, however, about 450 miles.

I became interested in this incident chiefly because on November 2, 1932, during a terrific snow and sleet storm from the northwest, a Fork-tailed Petrel (*Oceanodroma furcata*) was obtained by me at Northwest Cape, St. Lawrence Island, Alaska. A large flock of birds flew into the rigging of the U. S. Motor Ship "North Star" while at anchor only a short distance from shore. This bird was killed outright, while the others managed to fly clear of the rigging. It proved to be the only Fork-tailed Petrel I was able to secure during the nine seasons (including two winters) I spent on St. Lawrence Island, Alaska. They seem rather rare, at least near shore. The bird I secured is now no. 7508 of the Washington State Museum Bird Collection (see Archaeological Excavations at Kukulik, St. Lawrence Island, Alaska, by Otto William Geist and Froelich G. Rainey, 1936, Government Printing Office, Washington, D. C.; Appendix No. 5, The Birds of St. Lawrence Island, Alaska, by Olaus J. Murie). The question which naturally arose was: Could it be possible that the birds found dead at Curry, apparently during the same week, were of the same flock? To know that would be interesting because the distance would then be extended by over 200 miles (the distance from Northwest Cape on St. Lawrence Island to the mainland of Alaska directly to the east).

This same storm caused the vessel to drag anchor at Northwest Cape (Cape Chibukak) and forced it on several occasions during a period of nearly two weeks to seek shelter at "Boxer Bay," a small but fairly well protected harbor, which, incidently, is also the only one on the entire island. During one of the trips from Cape Chibukak to Boxer Bay, a distance of about 25 miles, made just before nightfall, there flew against the mast and rigging not less than two dozen Pacific Eiders (*Somateria v-nigra*), several King Eiders (*Somateria spectabilis*), and numerous Old-squaw Ducks (*Clangula hyemalis*). Most of these birds were killed.

As we were safely anchored in the little harbor, we could see and hear many weary birds of various sorts riding the much calmer water of the bay or flying toward it from the open sea. When looking over the side of the vessel, we could see by the ship's lights great numbers of them close to the vessel, chiefly Pacific Eiders and Old-squaw Ducks.

I was also able to observe a rather peculiar phenomenon during several of our trips to Boxer Bay, and also while we stayed there, which may be worth mentioning. Towering cliffs, used by various species of birds as rookeries during the nesting season, start some ten miles south of Northwest Cape and run on in a southerly direction to West Cape (where there is an enormous bird rookery) and on down to Southwest Cape. It seems that during heavy west, northwest, and southwesterly storms, the air moves at a terrific force against these cliffs (over one thousand feet high in several places), bounces back and forms an eddy. Sea birds, during heavy weather from any direction, as a rule fly by preference near the shore. At the time of my observations, they were chiefly flying south. Thus they would come in from the open sea in great numbers—strings of them; as soon as the cliffs were reached they turned south and flew with apparent great ease and speed southward, very close to, perhaps fifty feet from, the cliff.

One's first impression would naturally be that birds would keep far away from a cliff during such weather, to avoid getting dashed against it or blown and tossed upward, which would occur directly at the face of the cliff. I have observed that during heavy "face on" storms, fair-sized creeks, which ordinarily discharge over the cliff-top after heavy rains, discharge thus; but much of the water never reached the bottom until the storm broke, because the terrific up-draft at the cliff face picked up the running water, blowing it all over the ground atop the cliffs in enormous sprays and continually repeating the process until the force of the wind broke. At times the spray was carried straight up for about 100 feet above the cliff, then blown away with such force that one could not go within several hundred feet without rubber boots, raincoat, and rainhat.

Thus, the birds must know just how far they can go, for between "the devil and the deep sea" they seem to find flying shelter. This "sheltered lane" seems to be about 10 to 15 feet wide. It is also well known that some sea birds do not like to alight in a wild, churned sea, especially near land, but prefer to keep flying instead. Thus, it is possible for sea birds to be carried on far beyond their habitats. Once over unfamiliar lanes, especially over land in heavy weather or fogs, they may occasionally be driven far inland, to their doom.

Museum Department, University of Alaska, College, Alaska, October 20, 1938.

TERRITORIAL BEHAVIOR OF THE FLAMMULATED SCREECH OWL

WITH ONE ILLUSTRATION

By JOE T. MARSHALL, JR.

I had the good fortune to observe the Flammulated Screech Owl (*Otus flammeolus*) during the summer of 1938 at two localities, both in the Sequoia National Forest of the Sierra Nevada, in Tulare County, California. The first locality is the vicinity of Whitaker's Forest (property of The University of California) on the west slope of Redwood Mountain. The life-zone is Transition, consisting of open forest of yellow pine, white fir, incense cedar, and black oak which lies just below the heavy stands of big tree, *Sequoia gigantea*. The results of observations made here from May 20 to July 9 and from August 6 to 15 are summarized on the accompanying map (fig. 26) and table (p. 73). I found at least eighteen males, of which six were collected. Their territories, shown on the map, fall within an area of about two square miles between the altitudes of 4850 feet and 5800 feet. Females were heard or seen in five of these territories. One juvenal was obtained from campers near Whitaker's Forest. The dates of observation (both successful and attempted) of each individual are listed in the table.

The second locality is in the Canadian zone timber (Jeffrey pine, lodgepole pine and red fir) at Big Meadow, 7639 feet altitude, five miles east of Whitaker's Forest. Four males were collected and one female was heard on July 10. These were found within an area of fifty acres. The female was heard there again on August 15. The eleven specimens from both localities are now numbers 74629-39 in the California Museum of Vertebrate Zoology.

Success in locating, collecting, and observing the Flammulated Screech Owls depended on the use of a special method; namely, attracting them by uttering imitations of their hoots. Males readily answered these calls; but their shyness and their habit of concealing themselves in high, dense trees allowed no glimpse of them until their curiosity or antagonism was aroused by a long "conversation." Then they would follow me, uttering their curious "protest calls," and would allow themselves to be led into low trees and watched with the aid of a flashlight.

The eye-shine of this species of owl varies in color from pinkish at middle distances to white at long range. At close range, no eye-shine is visible because the bird's pupil contracts when a bright light falls upon it. I watched one bird at a distance of six feet, and noticed that a full eye-shine was visible for but a moment when the light was first turned on. Almost immediately, the pupils contracted; thereafter only two very small points of light were reflected. When the bird turned toward the darkness, a pinkish glint was reflected through the now widened pupil of the one visible eye.

The single hoot of the male Flammulated Screech Owl is uttered at regular intervals, constant in each individual but varying from a little over two seconds to more than eight seconds in different birds. The hoots are short, uninflected vowel sounds like *oo* in ***hoot***. Their approach to a staccato effect can be represented by the words ***poop, poop, poop***. Their pitch, fairly constant in all males, is about B above middle C. A male begins hooting with very soft notes a little lower than the usual pitch (B-flat or even A); he gradually raises the pitch and increases the intensity until the full, mellow tones are reached at B. The hoot, although not loud, is resonant and penetrating; it can be heard up to a distance of two hundred yards. Its baffling ventriloquial quality is noticeable when the birds call overhead. The outstanding feature of the call is its almost endless repetition. The first male met with at Whitaker's Forest (my number 377 in territory E) hooted almost continuously throughout the night of May 20. It maintained an interval of a

little more than two seconds, and paused as if listening for an answer after every fifteen to twenty-five hoots. The bird was silent for several minutes after moving from one perch to another, and was silent also for fifteen minutes before its last calls shortly after dawn. It was probably foraging in these intervals.

All males vary this simple call pattern by alternating a long series of single hoots with a succession of the same calls each preceded by two shorter notes. These shorter notes are slightly over a half step lower than the accented main hoot, from which they

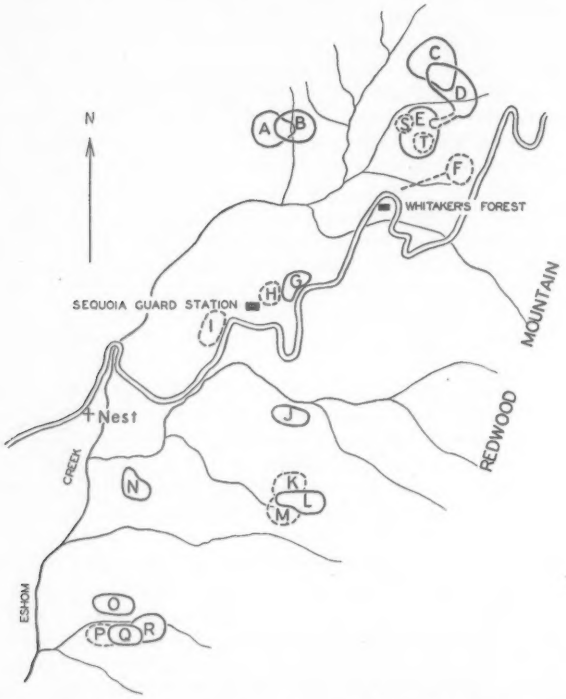

Fig. 26. Territories of Flammulated Screech Owls in vicinity of Whitaker's Forest, west slope Redwood Mountain, Sequoia National Forest, Tulare County, California. The full lines indicate actual boundaries of permanent summer territories where each respective owl has been observed many times on one or several nights. Those areas represented by broken lines indicate places where the owls have been heard on one or more occasions but the actual boundaries of their territories have not been worked out. Except for F, S, and T, the areas are assumed to be within the permanent summer territories of those owls. Scale approximately 1¾ inches = 1 mile.

are separated by a definite break in rhythm. In no way do they interfere with the pitch and timing of the main hoot. The entire call can be represented by *boot-oop, poop*; *boot-oop, poop*. Some birds, as indicated in the table, utter one or three of these "grace notes" instead of the usual two. Such variations are useful in distinguishing individuals, and they are represented as follows: *boot, poop; bootle, poop; bootle-oop, poop*.

A third call uttered by the males is merely a change in the quality of the tones described above. In a series of these calls, the tone of the usual note is gradually lost and is replaced by a hoarse, breathy, rushing sound, similar in quality to the sound made by a nighthawk in its nuptial dive. A male utters this call when a male from another territory alights near him. It is also uttered by males whose antagonism to my calls and close approach has been aroused by a long "conversation" and pursuit. I regard the note as a protest or intimidation call designed to keep intruding males away from the song perch and immediate forage area. I know of but one instance of strikingly similar behavior in another species, the Great Horned Owl. On the night of July 15, 1938, I was owl-hunting in the Canadian zone timber bordering Haskin's Meadow, 5150 feet, near Buck's Lake in the Plumas National Forest, Plumas County, California. My calls attracted a low-voiced Great Horned Owl, presumably a male, to the top of a red fir near me. I approached this bird, all the time uttering imitated hoots of the same pitch as his. He continued to answer in the typical full voice until I was within twenty-five yards of his tree. Then he suddenly changed the quality of his hoots to a terrifying, hoarse, rushing sound. The syllables and tempo of his original calls were kept intact.

Territory	Sex	Catalog number J. T. M., Jr.	Dates of observation	Distinguishing notes
A	male	.....	June 22, 27; August 9, 10	.....
	female	.....	June 22; August 9	Double inflection
	No owls heard June 28, August 8, 11.			
B	male	.....	June 11, 13, 15, 22, 27; July 9	.....
	female	.....	June 11, 13	Falling inflection
	No owls heard here June 28, August 8, 11.			
C	male	.....	June 4, 8; July 9; August 6, 13, 15	*bootle-oop, poop*
	female	.....	August 6	.....
D	male	.....	June 8, 11; August 6	*bootle, poop*
	This may be one of the males heard in E on August 13 and 14.			
E	male	377	May 20, 21	.....
F	male	.....	June 20	Unusually loud notes
G	male	413	June 7	.....
H	male	.....	June 10	.....
I	male	.....	June 12, 27	.....
J	male	.....	June 10	.....
K	male	.....	June 3, 10	.....
L	male	410	June 3	.....
M	male	.....	June 3	.....
	Last 3 not found during storm, June 7.			
N	male	432	June 12	*boot, poop*
O	male	430	June 12	.....
	female	.....	June 12	.....
P	male	.....	June 12	.....
Q	male	431	June 12	.....
R	male	.....	June 12, 27	.....
	female	.....	June 12	.....
S	male	.....	August 13, 14	.....
T	male	.....	August 13	.....

In the early part of the summer, male Flammulated Screech Owls promptly responded to my calls at any time of night and at dawn and dusk. After June 27, however, it became increasingly difficult to "call up" the owls at Whitaker's Forest. Those which did answer after much coaxing called only softly and intermittently. This may indicate that voice in this owl is correlated with the mating period, and this may be waning by the latter part of June in the Transition zone. The owls were still calling normally, however, on the night of July 10 at Big Meadow, in the Canadian zone. This

can be explained by the later arrival of spring in the higher zones. In August, no males were found at Big Meadow, and I had varying degrees of difficulty in finding them at Whitaker's Forest. Curiously enough, one new male was found (territory S), who called steadily and was easily approached at each time of observation.

The earliest time that a male was heard was about twenty minutes after sunset on June 15, when one answered my calls in territory A. The bird was sitting motionless in a dense clump of young white firs. I was reminded of similar habits in common Screech Owls, which come from their roosting places at sundown and sit quietly in the shadows until it is dark enough to forage. On only one occasion were males heard calling of their own accord much before dark. Even those answering my calls at dusk hooted a short time only, then remained silent as they foraged actively until dark. Most of their spontaneous hooting was done in the hours of darkness. One male (my number 413 in territory G) was hooting normally during a violent windstorm on the night of June 7.

With the exception of a curious "mating duet" (to be described later), the notes mentioned above are the only ones uttered by the males which I have observed. On a few occasions, however, another note was heard in several of the territories of males, often at the same time that males were calling. The pitch of this note is three and one-half steps higher than that of the male's call. Since the females of Screech Owls, Great Horned Owls, and Spotted Owls have higher calls than the males of those species, I infer that the female Flammulated Screech Owl gives the call mentioned above. It is a single, inflected *ooooo*, softer and longer than the clear-cut *poop* of the male. On only two occasions did I hear it more than two or three times in an entire evening. Although I collected no females, I believe that the following four observations provide evidence that the female alone utters this distinctive note.

At dusk on June 13, I arrived at territory B where a male was already hooting. Presently the hooting stopped and I heard from the same area a series of gurgling notes uttered apparently by two birds during a flight of about fifty yards through the trees. Following this, the male began hooting at the new location, and a female also called several times. Her calls had a pronounced falling inflection. It is probable that the gurgling notes comprise a "mating duet" performed by both sexes.

Two males were following in territories A and B on June 22. One was finally located in a clump of young cedars where he continued to hoot in answer to the other male. A silent bird was also in the clump of cedars and was within five feet of the male. A short time before, when both males had been in the same tree, the first had uttered typical protest calls. Now he was hooting normally—perhaps an indication that his silent companion was a female.

The third observation of an assumed female was made at Big Meadow, late on the night of July 10, when one gave a prompt answer to my imitated male hoots. It was very shy, and I was unable to see it although I followed it for three hours. During the course of my "conversation" with the female, two males were attracted at different times, and each was easily approached and collected. The female, however, allowed no approach within thirty yards, and remained so well concealed in the upper parts of the denser Jeffrey pines and red firs that no eye-shine could be seen. (In spite of her shyness, she was undisturbed by my wild shots fired at owl-like stubs and glistening drops of pitch.) Her note, uttered with a rising inflection and at intervals of from two to fifteen minutes, was almost as loud as that of a male. It had a muffled, whining quality. This female ranged through an area of about three acres, and I heard her twice there on August 15. No nest was found.

My fourth observation of a supposed female was made in territory A on August 6. This time the bird was both seen and heard. Its note, apparently uttered in alarm, was

heard in answer to both real and imitated Spotted Owl hoots, and it had a double inflection (rising, then falling). A male, hooting in the same territory, was silent while the Spotted Owl called. I have found that other males "freeze" and remain silent when Spotted Owls hoot; therefore, I believe that the alarm note is uttered only by a female.

I was unable to find any occupied nests of Flammulated Screech Owls at Whitaker's Forest. None of the many males heard or watched for long periods of time was ever seen to engage in nesting activities. The fact that they always could be "called up" in their respective territories indicates that they could not be incubating. Apparently the female alone raises the brood. Her secrecy and extreme shyness confirm this. It is possible that the note of the female is uttered only on those rare occasions when the bird is alarmed about the nest. The only positive indication of nesting at Whitaker's Forest is furnished by the juvenal, my number 511, which I obtained from campers on August 6. It had been taken two weeks before from a cavity in a rotted pine stub felled for firewood. The stub had stood in the open, thirty yards from a highway. Its location is indicated on the map. Two other young in the nest had been killed by the fall. Several flying squirrels and their nest were also in the stub, according to the campers. The one live, though injured, owl had been kept in captivity until it died a week later. Its wing and tail feathers were fully grown and were identical in color with those of an adult. The juvenile body feathers were transversly barred with gray and white; there was no indication of rufous color on them.

With the exception of the birds in territories F, S, and T, each Flammulated Screech Owl at Whitaker's Forest was always found within the same area or territory. As shown on the map, these territories are not evenly distributed. They occur singly or in small groups here and there throughout the more open forests, on flat or moderately sloping ground. None is found in deep canyons or in the dense stands of big tree farther up Redwood Mountain. The territories are small; the birds seldom range through an area more than three hundred yards in diameter.

A mild and unaggressive territorial behavior is evidenced by the males. Each advertises his territory by incessant hooting from "song perches" established in tall, densely foliaged conifers. Adjacent territories overlap to a certain extent—an indication of the mildness of territorial restriction on the part of the males. A male utters the "protest call" only when an intruding male alights in the same tree or group of trees where he is perched. Even at that time, no actual conflict arises. This overlapping of territories occurs when several birds from adjacent territories are simultaneously aroused by my hoots. My observations on single males, of which the following example is fairly typical, lead me to believe that under natural conditions, their calls usually suffice in keeping intruders away. This example is unique in that the male was far from his own territory (F) when first heard on June 20. His speedy withdrawal upon hearing my imitated hoots seemingly indicated that he was allowing himself to be driven out of the supposed territory of another bird. He was followed with great difficulty (he kept almost beyond hearing distance) directly uphill for five hundred yards, along a route indicated by the dashed line leading to territory F on the map. Here, apparently within his own territory, he stood his ground and soon came down into a dense group of young cedars where I was hooting. His ensuing actions in fluttering about my head and peering in all directions indicated that he was looking for an intruding owl. Finally he faced me and uttered for a long time the hoarse "protest calls." This series of responses to my imitated calls is paralleled by males found within their own territories. Upon hearing my hoots, they retreat deeper into their territories. If followed to one of their central "song perches," they descend and look for the supposed intruder, meanwhile keeping up a continuous volley of their intimidating "protest calls."

One peculiarity in the territorial relations of the owls was noted on August 13. Three males were heard in territory E, which had been unoccupied since May 21 when male number 377 was collected there. (Their territories are indicated on the map by S, T, and an extension of D into E.) Two were heard on the following night. The one bird which was observed closely seemed perfectly at home in its new and well-defined territory (S), and was found in the same group of trees on both nights. It was seen at a distance of six feet and was found to be in adult plumage. These birds are not included in the count of males at Whitaker's Forest because they may have come from some of the territories worked out earlier in the season. Possibly the owls move around somewhat in the late summer. It is difficult to check the territories at that time, because many of the birds no longer respond readily to imitated hoots.

All the territories except F, S, and T were worked out between May 20 and June 13. During that time at least, each owl was found in the same small area every time that the area was visited (except June 7, when there was a violent windstorm). Furthermore, I made checks on the birds to make sure that the same one was not being found in all the territories. One check consisted in recognizing differences in the notes of certain birds—as mentioned previously. Each bird with a distinctive note was found always in the same territory. Checks were made on neighboring birds by first "calling up" each in its particular territory, then hearing them all hoot in unison. I accounted for birds in widely separated territories by "calling them up" one after another. Each successive owl was left while it was still hooting, and its calls faded in the distance as I proceeded to the next. Thus on the night of June 12, six males were heard in territories I, N, O, P, Q, and R, respectively. Three were collected, and the remaining three were heard afterward in their respective places.

A "conversation" with a male terminates when the bird finally "loses interest" and ceases to hoot. Often on such an occasion the bird can be watched foraging in the lower parts of trees. A male in territory B was thus watched in a black oak on June 11. It perched on bare branches or stubs in the lower and middle parts of the oak and remained at a given perch for a minute or more, peering from side to side and upward and downward with rapid movements of the head. Apparently it was scrutinizing the branches for insect food. After fixing its gaze on a particular branch, it would fly rapidly to it, often picking up and swallowing something.

This occasional night foraging is leisurely compared with that at dusk. Furthermore, at night the birds hoot for long periods without moving about, and they are sometimes seen in a resting position, crouched low and motionless, with feathers fluffed out. Probably the greater amount of foraging is done at dusk (also at the equivalent silent period before the last hooting at daybreak).

The forage behavior of the Flammulated Screech Owl at dusk is a remarkable demonstration of agility and power of flight, as the following observations indicate. A male in territory C responded to my calls soon after sunset on June 8. It called for a short time only, then flew to a grove of young cedars. As long as it was seen, it continued to dart with great rapidity among these trees. Many large flying insects were in the air at the time, and the owl was apparently catching them in its beak while on the wing. Once he flew swiftly out of the grove, darted suddenly upward, made an abrupt turn, then flew back into the trees. He had obviously caught an insect on the wing and had done it in an accelerated poor-will or flycatcher style. Similar behavior was noted on June 10 at territory J, where a male was foraging high in an open grove of tall yellow pines. He flew with direct, swift flight from tree to tree, and perched close to the trunk and high in each tree. This bird also made a rapid insect-catching flight; he flew out from his

perch, poised a moment, then turned abruptly and alighted again at the same perch. Male number 430 at territory O, in a comparatively dense forest, was foraging on June 12 with long, zig-zag, bat-like flights through the tops of the trees.

In addition to arboreal and open-air feeding, these owls also feed to a certain extent on the ground. Male number 377 was perched three feet above the bare earth under some small cedars when he was collected May 21 in territory E.

The stomach contents, which were saved from all the specimens collected, furnish ample evidence that the Flammulated Screech Owl feeds mainly on flying insects, at least in summer. Dr. E. C. Van Dyke, of the Department of Entomology at the University of California, examined nine stomachs and found them to be filled with moths, among them several large hawk moths, which can be caught only by a bird of unusual powers of flight. The absence of birds and mammals from the stomachs indicates that the small size, weak feet, and rapid flight of this owl favor a diet of insects rather than one of vertebrates. Besides the great preponderance of moths in the nine stomachs, there were also the remains of the following invertebrates which could have been caught on the ground or in trees: 1 beetle, several spiders, a few grasshoppers, and several centipedes.

A striking feature in the behavior of the Flammulated Screech Owl is its habit of concealment. Males, when hooting from their "song perches" in the highest and densest trees within their territories, remain in the upper parts of the trees (never at the top) and close to the trunks, where they are well concealed by the peripheral foliage. Even foraging birds alight in the interior parts of the trees, and their swift flight cuts their time of exposure in the open to a minimum. The color pattern blends remarkably well with the trunks of conifers and with the gnarled branches of black oaks. These facts lead to a consideration of the possible nocturnal enemies of the Flammulated Screech Owl. It is to be expected that larger owls might feed on them. The only large species of owl at Whitaker's Forest is the Spotted Owl, and it is significant that no Flammulated Screech Owls have territories within a large area east and south of Whitaker's Forest, all of which is occupied by a pair of Spotted Owls. Males are silenced by Spotted Owl hoots; the alarm note of the female in response to them has been described.

The Flammulated Screech Owl is remarkably agile and quick in its movements. When looking about, it moves its head very rapidly, often in a circle in the frontal plane. This peculiar movement permits an object to be viewed from all possible angles and against a changing background. The bird stands rather high and in a sub-vertical posture from which it can take instant flight. Often, however, the take-off is preceded by a moment of hesitancy during which the bird assumes a horizontal position and faces in the direction of the flight which is to follow. In taking off, the bird does not jump from its perch, but gets under way entirely by wing action. The wings beat rapidly and regularly, producing straight, not undulating flight. In hooting, the bird does not noticeably open its mouth; with each note, the flanks are pressed in and the throat bulges out.

The plumage of the Flammulated Screech Owl is compressed except when the bird is in the resting position (described previously). It gives the bird a trim, tapering outline. The feathers of the "ear" tufts are not much longer than the other feathers of the crown, but the tufts are very conspicuous when they are erect and the other feathers are depressed. I have on only one occasion seen the tufts erected at night. Male number 494, only slightly wounded when shot at Big Meadow on July 10, was retrieved from a red fir bough where it had been sitting with head held high, wings and feathers pressed close to the body, and the "ear" tufts fully erect and pointing straight upward. In this posture it presented a fierce, cat-like expression. It is significant that the same posture

was assumed by this bird when it roosted the next day. In either circumstance, both when the bird is in grave danger at night and when it is sleeping in the daytime, it takes on a fierce, intimidating expression which may be effective in protecting it. The concealment afforded by this posture was demonstrated by the captive bird when it roosted in a lodgepole pine. It elongated itself against the trunk of the pine in such a way that it resembled a knob of bark rather than a bird. Furthermore, its plumage blended so perfectly with the color of the bark that the outline of the owl was almost indistinguishable.

It is evident from this short discussion of the behavior of the Flammulated Screech Owl that many questions are unanswered. Do the birds migrate down the mountain in winter? What is their food in winter? Do the males maintain their territories throughout the year? How does territorial behavior under natural conditions compare with the artificial behavior stimulated by imitated calls? What is the behavior of the nesting female and young? Does the territory of the male coincide with the nesting area used by the female? Light will be thrown on many of these problems after more nests are found, and after the birds are observed in winter. I look forward with great pleasure to the opportunity of making these further observations on this fascinating little owl.

Museum of Vertebrate Zoology, University of California, Berkeley, January 12, 1939.

FROM FIELD AND STUDY

How Does the Ruby-crowned Kinglet's Crown Work?—The elusive brilliant crown-patch of the male Ruby-crowned Kinglet (*Corthylio calendula*), the first glimpse of which brings such a thrill for the amateur bird student, was displayed with unusual distinctness as I looked down on a bird from a second-story window. Momentarily the brilliant patch was seen to narrow into a slit, as if closed over by the feathers on either side, like the shutting of an iris diaphragm with an elongated aperture. Might this be the mechanism of revealing and concealing the crown patch, rather than a simple raising and lowering of the crown feathers?—FRANCES CARTER, *Berkeley, California, January 22, 1939.*

Duration of Colonies of the Cliff Swallow.—Near the close of his interesting paper on "The Swallows at the Life Sciences Building" (Condor, vol. 39, 1937, pp. 206–210), Joseph Grinnell remarks, "I cannot recall any relatively permanent cliff swallow colony, either on rock surfaces or on buildings. Colonies have come and gone. Two or three years of occupancy of any one exact site has seemed to be the limit."

This view, which is explicitly said to be based upon memory, is in such contrast to my own impression, which also depended largely on memory, that it surprised me greatly. The greater part of my experience with Cliff Swallows (*Petrochelidon albifrons*) was obtained in Nova Scotia, especially in the southwestern part of that province, during the years from 1909 to 1918. Colonies of these birds, nesting chiefly on barns, were then common in Yarmouth County, Nova Scotia, and, I understand, still are so. Except when destroyed by evident and irresistible agencies, these colonies seemed to me to be relatively permanent.

In order to obtain a more substantial and definite factual basis for an opinion concerning this matter, I have corresponded with two residents of Yarmouth County, namely, Mr. E. H. Rogers, of Arcadia, and Mr. Charles H. Butler, of Chebogue Point, who have colonies of Cliff Swallows nesting on their barns.

Under date of September 25, 1938, Mr. Rogers writes, with reference to his colony of Cliff Swallows: "I don't know how long they have been here. They were here as long ago as I can remember, which must be a good sixty years, as I am now sixty-eight years old. At that time there was a lot of the birds. About fifty years ago I counted the nests in the eaves of my barn. There were 254 nests. A few years later my barn roof began to leak. The water would run down and soak the nests and they would fall down. They kept going that way until there were only four or five pairs left. About five years ago I shingled my barn and was in hope that my birds would come back, but they do not increase very rapidly. I did not count them this year, but I think there were about fifteen pairs."

Under date of October 19, 1938, Mr. Butler writes that, before answering my inquiry, he consulted Reverend W. A. Robbins, of Shelburne County, Nova Scotia, whose father was born on the farm now occupied by Mr. Butler and lived there all his life. Reverend Mr. Robbins said that Cliff Swallows nested annually, throughout his father's life-time, on the barn on this property. Mr. Butler adds: "This summer has been the same; in fact, I think there was a much larger colony than ever before, as this 85-foot barn can boast of 150 nests in a row and I found that several pairs had gone over to another barn, some 150 yards away, and built their nests and raised their broods. . . . You will see by the number of nests that there must have been at least 150 pairs and I am safe in saying that swallows have been coming to this barn well on to ninety or a hundred years. This barn is a very old building and has been repaired many times; about five years ago I had the whole front torn out, new sills and doors put in, and then shingled up within one foot of all their nests; we were about a week doing the job, and these birds came and went and fed their young and paid little attention to us."

It appears that the duration of Cliff Swallow colonies is different in geographical regions so dissimilar as California and Nova Scotia, the colonies in the last-named region having often much longer duration than those in the first-named. This difference may be due to different inborn behavior patterns in different geographical sections or clans of the Cliff Swallow species, or it may be correlated with differences in parasites or with a difference between the climates of the regions concerned. That it is due to the known pronounced difference in climate seems to me most probable.—HARRISON F. LEWIS, *Ottawa, Canada, December 27, 1938.*

Nesting Habits of the Western Red-tailed Hawk.—During the spring and summer of 1937, I watched a nest of the Western Red-tailed Hawk (*Buteo borealis calurus*) by visiting it nearly every day. It was located upon a pinnacle three miles north of Price, Utah. This pinnacle

was near a mesa on which grew a heavy stand of piñon and juniper. Located at the extreme base of the Book Cliffs, this mesa has an altitude of about 5900 feet, an annual precipitation of 10.6 inches, and an annual mean temperature of 47.8 degrees F.

Formerly about six pairs of hawks built nests on pinnacles within two hundred feet of one another, but boys were able to remove the young from all the nests but one. Remnants of these nests of other years are yet to be seen. This last one, over fifty feet above the sidehill, was inaccessible, but it could be looked into from the rim of the adjacent mesa. The air-line was not over thirty feet; a pair of binoculars brought the scene nearer.

On March 20, 1937, the hawks began to re-line with juniper bark the nest they had been rebuilding with sticks. This nest was reconstructed upon the debris of six or more nests of as many previous years. April 12, one egg was deposited in the nest and the second and last egg appeared April 14. Incubation began after deposition of the last egg. During the interval between the laying of the first egg and the last, a hawk was on the nest occasionally but not at all times, although both parents were always near. The mate of the incubating bird always flew from a nearby pinnacle. Parts of a rabbit were often on the edge of the nest.

At 7 p.m., May 17, the first young was half out of the bluish-white shell. The second hatched either on the evening of May 18 or the morning of May 19. Early afternoon of the 18th the nest contained one young hawk and one egg, but at the same hour the next day there were two young hawks and the headless body of a large blow snake. Both adults flew in circles over the nest and were constantly calling while I was near.

The incubation period, counting from the deposition of the first egg until it hatched, would be 35 days. Bent, in his "Life Histories of North American Birds of Prey . . . (Part 1)" (U.S. Nat. Mus., Bull. 167, 1937, p. 170), gives 28 days as the incubation period for this species. Neither Bent nor Bendire (quoted by Bent) mention a specific case or state their method of reckoning of the time of the incubation period. Even though one counted from the date of the deposition of the last egg until the hatching of the first bird, the incubation period would be greater than 28 days.

These young hawks were watched almost daily until the morning of July 2 when they were seen to fly from the nest for the first time. Their food consisted of rabbits (*Lepus californicus deserticola* and *Sylvilagus* sp.) and blow snakes (*Pituophis catenifer deserticola*). Once a large branch of joint fir, *Ephedra nevadensis*, was seen in the nest. Its purpose is unknown, but it is supposed that bits of it served as food, as the nest did not need repairing and the branch was too small to offer shelter by shading the birds from the hot sun. Not long after their first flight, the hawks were seen to take a dust bath in the soil of the nearby mesa.

This pinnacle with its nest crashed to the sidehill below after a heavy rain during the last week of March, 1938. The nest had again been relined with juniper bark and seemed about ready for the first egg.—Ross Hardy, *Dixie College, Saint George, Utah, December 20, 1938.*

An Unusual Nesting Site of the Western Tanager.—All accounts of the nesting habits of the Western Tanager (*Piranga ludoviciana*) to which we have had access state that it builds well out on horizontal limbs at heights varying from 12 to 60 feet above the ground. Grinnell and Storer (Animal Life in the Yosemite, 1924, p. 496) cite, as an exception to this rule, a case in which a pair of Western Tanagers built their nest in a rose bush within 10 feet of the earth. J. K. Jensen (Auk, vol. 40, 1923, p. 464), in recording the presence of 12 nests in Santa Fe County, New Mexico, says that most of the nests were placed far out on horizontal limbs of the Douglas fir, 10 to 12 feet above the ground, then adds, "Only one nest was placed in a scrub oak." No other exceptions to the usual habit of placing the nest well above the ground appeared in the literature we consulted. It seems desirable, therefore, to record one more exception, one that is even a greater departure from the usual selection of nesting sites than those cited by the writers mentioned above.

During the early forenoon of July 30, 1938, while fishing on the Middle Fork of the Stanislaus River, we left the immediate edge of the stream for a short distance to follow a trail that led through a heavy stand of Douglas fir. As we approached an outcrop of rock that formed a small overhanging ledge a female Western Tanager flushed from the small recess (about four feet long and a foot deep) beneath this ledge. She flew to the bough of a fir tree a few feet away, and thinking that she had been foraging on the ground we scanned the surrounding trees for a nest or young birds but saw neither. In a few seconds the male bird joined his mate and both scolded mildly. We continued on down-stream and the female, paying no attention to us, remained in the fir tree. The male followed us for nearly two hundred yards, scolding moderately from the tops of nearby dogwood bushes, or ignoring us occasionally while he dashed out over the stream in pursuit of some insect.

About noon we were returning to our car upstream when we approached the ledge again. This time the female flew while we were a dozen feet away. A slight movement at the point from which

the female had flushed caught our eyes and there on the ground, nicely roofed by the overhanging ledge, was a nest containing four recently hatched birds. None had its eyes open as yet, even though the end of July is late for a brood of tanagers to be hatching.

The nest was a shallow, flattish structure about 6 or 7 inches in diameter. The materials used were rootlets, bits of slender twigs, a few scraps of either willow or dogwood leaves, a few tufts of moss and a considerable number of pieces of lichens. The lining appeared to be mostly fine grass blades and bits of lichens, though the birdlets were not molested and we did not see the entire interior of the nest.

There could be no doubt that the nest belonged to the pair nearby, for we had seen the female rise from the same spot twice, though we missed the nest the first time because we thought she was searching there for food. And as we moved on up the trail she immediately returned to her brood, while the male again followed us fully a hundred yards, scolding us at intervals until he felt that we no longer menaced the nest.

This nest was located on the south side of the canyon, the overhanging ledge situated in deep shade in a stand of Douglas fir, about an eighth of a mile below the point at which the Clark Fork enters the Middle Fork of the Stanislaus River. (See the Dardanelles Quadrangle of the U.S.G.S. topographic maps.) It was at an altitude of between 5500 and 6000 feet, in the Arid Transition Zone. There was no scarcity of good arboreal nesting sites in the vicinity, so the choice seems a strange one.—IRA L. WIGGINS and BRUCE L. WIGGINS, *Palo Alto, California, December 5, 1938.*

Notes on the Distribution of Herons in California.—*Ardea herodias hyperonca.* California Great Blue Heron. A breeding colony located with that of the Farallon Cormorants along Sandborn Slough, Sutter County, has fared better than the latter, at least up to February 26, 1931, when last visited and about 20 pairs were commencing to lay. On February 16, 1929, upward of 50 occupied heron nests were counted here. The cause of their depletion is the same as for the cormorants (see Moffitt, Condor, vol. 41, 1939, p. 33).

Over 30 pairs of Great Blue Herons were nesting with the cormorants along Cut-off Slough, Suisun Marsh, April 11, 1920, when a set of fresh eggs of the former was collected; by 1936, the herons had deserted the colony. These observations indicate that the two species may nest together harmoniously. Instances in each colony were found where heron nests occupied the upper parts of trees in which cormorant nests were situated lower down.

An immature Great Blue Heron (no. 1979, now in Paris Museum) was found electrocuted below high tension wires, 5 miles southeast of Willows, Glenn County, December 18, 1936, by J. Delacour and me. Its stomach held remains of six harvest mice (*Reithrodontomys*).

A Great Blue Heron was observed to alight on the surface of Clear Lake, Lake County, mid-day of July 15, 1938, at least a third of a mile from shore. When first seen it was flying, but it soon alighted near what appeared to be a dead young Western Grebe. It sat on the surface near this object for fully three minutes, where it provided an unusual appearance, its long neck held curved like an old Western Grebe's. Although it was dead calm, the heron then took flight with no effort, taking off directly with legs held trailing until it was well under way. No attempt was made to assist flight by paddling the feet on the surface (see Cottam, Condor, vol. 41, 1939, p. 37).

The unique ground-nesting colony of these herons near Redwood City, reported by Carriger and Pemberton (Condor, vol. 10, 1908, pp. 78–81) as composed of 49 nests on April 14, 1907, continues existence in approximately the same number. April 1, 1928, I collected several sets of fresh eggs from it and last visited it March 25, 1936, when between 30 and 40 nests were observed without special search.

Casmerodius albus egretta. American Egret. Had I kept note of observations of this bird in the San Francisco Bay region in the decade preceding 1925, a number of records could be provided to indicate its gradual increase over that period. Positive recollection, upon reading Stoner's report of 12 birds on the Suisun Marsh, November 16, 1925 (Condor, vol. 28, 1926, p. 175), avers that the species was observed there at least as early as 1921, and also in winter and early spring of the following four seasons (near Cygnus Station and four miles south of Suisun). I handled an egret of this kind shot by a gunner two miles southeast of Shellville, Sonoma County, in winter, between 1911 and 1913.

In the area of the Sacramento Valley bounded by Willows, Gridley, Colusa and Williams, my notes record this egret as being rarely seen on visits in the last three months of the years 1921 through 1924. On June 14, 1925, one was observed six miles west of Colusa; by 1928, the species was fairly common. On October 15, 1928, two were noted near Delevan; the next day nine were counted a mile east of Willows, each one perched atop a rice shock in a paddy field. Since that time, numerous observations indicate the egret population of the Sacramento Valley to have increased by leaps and bounds.

In the San Joaquin Valley, American Egrets appear to have become reëstablished in numbers earlier. Between 30 and 40 individuals were noted near Los Baños, June 21, 1925. The existence of a thriving colony of about 50 pairs south of Gustine is known to many bird students.

Egretta thula brewsteri. Snowy Egret. Autumn observations in the Sacramento Valley over the past 10 years indicate this species to be present in the above area in a ratio of about 1 to 20 as compared with the larger form. An unusual number of small egrets, in pairs totalling 10 birds, was noted 5 miles east of Delevan, Colusa County, February 16, 1929.

Nycticorax nycticorax hoactli. Black-crowned Night Heron. This is another species that has been driven by man from a rookery in the eucalyptuses of Cut-off Slough, Suisun Marsh. Small mummified young, presumably of the preceding year, were found in old nests there on March 28, 1936. A few adults were noted near-by at the time, but no fresh nests were in evidence.

A breeding colony has persisted for many years on the northern part of Belvedere Island, Marin County. Sets of eggs with advanced incubation were taken there April 22, 1918, and April 2, 1920, at which dates about 25 pairs were nesting. Last visited July 18, 1938, no herons were seen, but 31 nests in live oaks and bays bore evidences of having been used this season. Since the earlier visits, houses have been built near the colony and more recently the brush has been cleared from the land beneath the nesting trees so that the birds have much less privacy than formerly. It appears that this colony will not persist much longer.

Ixobrychus exilis hesperis. Western Least Bittern. Supposed to be summer visitant only to northern California. C. C. McGettigan has a mounted male specimen taken on the Greenhead Club, 6 miles west of Pennington, Sutter County, December 28, 1924. I saw the bird in the flesh. Exactly six years later (December 28, 1930) my wife and I were gunning on the same grounds from a bulrush "island" 15 feet in diameter, when a Least Bittern flew from the shore to alight at arm's length in the rushes. Here we watched it for many minutes, unwilling to take it at such close range with heavy duck guns. Efforts to drive it to flight failed and it remained while several shots were fired at ducks. I intended to keep watch that it did not fly away and to collect it from a distance after the hunt, but it evidently left the thicket when we were not watching, as search later on failed to divulge its presence. Another Least Bittern was seen in this locality, June 13, 1925. These records indicate that this elusive species is probably resident in the Sacramento Valley.

A set of five Least Bittern's eggs, incubation advanced, was taken from a bulrush thicket three miles south of Los Baños, June 10, 1928. Neither parent was seen.—James Moffitt, *California Academy of Sciences, San Francisco, August 20, 1938.*

The White-tailed Ptarmigan of Vancouver Island.—In commenting on six juvenile specimens of White-tailed Ptarmigan collected by him on the mountains bordering Great Central Lake, Vancouver Island, H. S. Swarth (Univ. Calif. Publ. Zool., vol. 10, 1912, p. 25) first pointed out the distinctive black and white head and neck color of the Vancouver Island birds as compared with other White-tailed Ptarmigan. Except for two juveniles collected on Crown Mountain by W. B. Anderson in 1912, and a winter adult taken near Cowichan Lake by Dr. Stoker in 1905, Swarth's specimens, in the California Museum of Vertebrate Zoology, were at that time the sole representatives of the Vancouver Island ptarmigan. During the past summer the author and P. W. Martin of Victoria, B. C., in the interests of the British Columbia Provincial Museum, collected a series of ten specimens on Mount Arrowsmith.

Comparison of these specimens with a large series of *Lagopus leucurus leucurus* from various points on the mainland of British Columbia, and with specimens of *Lagopus leucurus rainierensis* from Mount Rainier, Washington, kindly loaned to us from the Biological Survey collection of the United States National Museum by Dr. H. C. Oberholser, makes it clear that the insular conditions of Vancouver Island have fostered the development of a race of ptarmigan differing markedly from all adjacent races. For this race I propose the name

Lagopus leucurus saxatilis, new subspecies

Type.—Male adult, no. 8324, coll. B. C. Provincial Museum; Mount Arrowsmith, Vancouver Island, B. C., 6000 feet altitude; September 11, 1938; collected by I. McT. Cowan and P. W. Martin; original number 1580.

Diagnosis.—Like *Lagopus leucurus leucurus* but larger, with longer tail; with larger, more hooked bill; head and neck black and white without, or almost without, buffy wash; shafts of primaries black.

Range.—So far as known, confined to the higher peaks of Vancouver Island.

Specimens examined.—All from Vancouver Island, B. C.: Mount Arrowsmith, 10; Crown Mountain, near Upper Campbell Lake, 1; mountains at head of Cowichan Lake, 1.

Measurements.—Average, maximum and minimum measurements of five adult males: Total length (in the flesh) 366 mm. (375–358); tail 104 (106–100); wing 181 (187–178); exposed culmen 17.4 (18–16); nostril to tip 10.9 (11–10.5); depth of bill 8.7 (9–8). One adult female measures: Total length 350 mm.; wing 172; exposed culmen 18; nostril to tip 11.2; depth of bill 7.6.

Fig. 27. Comparison of bill shape in adult males of three races of White-tailed Ptarmigan: (a) *Lagopus leucurus leucurus*, no. 350, coll. K. Racey, Alta Lake, B. C.; (b) *L. l. saxatilis*, no. 8324, Provincial Museum, Mount Arrowsmith, Vancouver Island, B. C.; (c) *L. l. rainierensis*, no. 269376, Biol. Survey coll., Mount Rainier, Washington.

Comparisons.—Twelve specimens of the Vancouver Island ptarmigan are available for study. Of these, five are adult males in preliminary winter plumage (for terminology, see Dwight, Auk, vol. 17, 1900, p. 149), one adult female in preliminary winter plumage, one adult male in winter plumage, and five are young birds in the transition from juvenal to first winter plumage. In comparison with 26 specimens from Atlin, Revelstoke, Robson and Alta Lake, on the mainland of British Columbia, these differ in having the first primary quill black or shaded with black in 100% rather than 15% of the specimens examined. The same difference, though to a less degree, persists in the rest of the primary series.

Adult males of *saxatilis* differ from comparable birds from the mainland of British Columbia, and from *rainierensis*, in larger size, longer tail, larger, more hooked bill; in having head and neck clear black and white, with little or no admixture of brownish in the plumage, and ochres of the back and flanks averaging richer, browner and less gray.

The single adult female of *saxatilis* differs from all comparable mainland birds in having the ground color of the dorsal region and sides of the breast rich brown rather than grayish or brownish gray.

The juveniles differ as markedly as do the adults. Vancouver Island birds have the black and white barring of the head and neck slightly more subdued than the adults and with a tendency to more brownish in the ground color; nevertheless in comparison with the even brownish gray, finely speckled with black and white characteristic of the mainland birds the difference is striking. The juvenile specimens of *saxatilis* differ further in having the backs browner and more heavily mottled with black.

Females and juveniles of *Lagopus leucurus rainierensis* differ from comparable specimens of *saxatilis* in having the bill smaller and nearly straight rather than strongly hooked; they differ further in that the head and neck lack the strong black and white barring.—IAN MCTAGGART COWAN, *Provincial Museum, Victoria, B. C., November 7, 1938.*

Red-tailed Hawk as Possible Enemy of Skunk.—On February 13, 1938, I found dead at the roadside between Castroville and Monterey, California, a Western Red-tailed Hawk (*Buteo borealis calurus*). The cause of death was not ascertained, but the feathers of the bird's breast and belly were soaked with the pungent musk (fluid) of skunk. Certainly the two animals had been close together, if not in contact; otherwise the feathers could hardly have been as thoroughly saturated as they were with musk.—ALBERT C. HAWBECKER, *34a Jefferson Street, Watsonville, California, November 23, 1938.*

Old-squaw Taken at San Diego, California.—As there appears to be no record of the capture of an Old-squaw (*Clangula hyemalis*) in southern California waters since 1921 (Anthony, Auk, vol. 39, 1922, p. 104), it may be worthy of note that I secured a specimen of this duck on San Diego Bay, November 11, 1938. The bird was a female in typical winter plumage, and it is now specimen no. 17944 in the collection of the San Diego Society of Natural History. There was also at this time an unusual number of White-winged Scoters (*Melanitta deglandi*) on the bay, perhaps 500 individuals in all—more than I had ever previously observed.—J. W. SEFTON, JR., *San Diego Society of Natural History, Balboa Park, San Diego, California, December 5, 1938.*

Notes on Some Birds Nesting in Northern Idaho.—I have selected the following from among my field notes taken while I was stationed on the St. Joe National Forest in northern Idaho. Their particular interest lies in the bearing that they may have on the behavior of certain more or less common species of birds under unusual conditions or circumstances.

On July 21, 1932, I discovered a pair of Mountain Bluebirds (*Sialia currucoides*) feeding fledglings at Bathtub Mountain. The nest was in a wooden box which had been nailed to the outside of the log cabin occupied by the lookout man and had evidently been used previously as a makeshift cupboard. The floor space measured roughly 10 by 18 inches and the birds had filled the entire space with nesting material to a depth of three or four inches, while protruding from the mass the following foreign items were noted: A coil of insulated copper wire; six or seven sixty-penny spikes; an old telephone condenser; two large, rusty iron bolts; several pieces of chalk-line and a large chunk of blue carpenter's chalk. The nest was not disturbed and one can only conjecture what further items a careful inventory would have brought to light.

On June 19, 1934, a Western Robin (*Turdus migratorius propinquus*) was noted on its nest in a thicket of mountain hemlock near Monumental Buttes. The peculiar posture of the bird led me to investigate further and to arrive at the following deduction. The nest had evidently been built or at least started while the sapling was bent into a horizontal position by the weight of accumulated snow and ice in the top. As the sun's rays melted the ice, the sapling was gradually released until on the date noted, the nest was tilted at a precarious angle so that when the bird flushed at my approach, the eggs barely missed being dumped to the ground, eight feet below. With a stout piece of twine I secured the sapling and bending it to its former position anchored it to a nearby bush. Before I left I was rewarded by seeing the bird brooding again, this time in a normal position.

On July 17, following the robin episode, I was witness to the final stages of the following incident. While I was inspecting a road construction job at Reid's Gulch, one of the road workers preparing to blast through a rock bluff discovered a nest containing three fledglings, identified later as Townsend Solitaires (*Myadestes townsendi*) in a crevice in the rocks. The nearest powder charge was not close enough actually to destroy the nesting site, but should the charge be touched off in its then location, that the nest would be demolished and the young birds killed was a foregone conclusion. The powder man had his definite instructions to blast the cliff, so only one thing could be done. One of the men scooped the entire structure, fledglings and all, into his hat and removed it to a safe distance while the shot was fired. A large, jutting overhang which had been within six feet of the nest was completely shot away, but as I arrived on the scene the nest with its contents was being replaced in the undamaged crevice; and within a short time a parent bird appeared and began feeding the hungry youngsters.

On May 16, 1937, I flushed a female Cinnamon Teal (*Querquedula cyanoptera*) from her nest located within eight feet of the main-line track of the Chicago, Milwaukee, St. Paul and Pacific Railroad just east of St. Maries. The nest contained eight eggs; when visited on the 24th and again on the 29th, the clutch had increased to eleven, the female brooding on both occasions. The remarkable fact, however, was that four regular passenger and two or more freight trains passed each day without appearing to disturb the brooding bird in the least. Standing at a distance of 75 feet from the tracks one could readily feel the ground shake as the "Olympian Express" rumbled past, and it is not difficult to imagine the sensation that this mother duck must have felt before becoming inured to the situation. When I approached on foot she would invariably flush before I was within fifteen feet of the nest, but though I often watched closely I never saw her leave at the passing of a train. Unfortunately, I was transferred to another locality on the first of June, so I did not determine whether this nesting venture was successfully completed.—R. L. Hand, *Missoula, Montana, December 8, 1938.*

Additional Notes on the Black Pigeon Hawk.—While on a vacation trip to Paulina Lake, Deschutes County, Oregon, during August, 1938, I was very much surprised to find *Falco columbarius suckleyi* in that region, so far east of the main divide of the Cascade Mountains. As we crossed the lake on August 5, I saw two small hawks flying close together low over the water, but as they were quite a distance away I could not be positive. Camp was established in the lodgepole pines near the shore of the lake in the isolated northeast cove where the beach is quite wide and open. Numerous small mineralized springs and seeps keep the ground moist and provide an excellent place for small birds to congregate during the heat of the day to bathe and drink. The mineral water seemed to be relished by deer, as also by many robins, crossbills, chipping sparrows and juncos. My companions, Mr. and Mrs. William L. Finley, Mr. and Mrs. W. J. Smith, and Mrs. Jewett, all trained observers, and I, spent many hours watching and studying this bird concentration.

About eight o'clock in the morning of August 8, while a large number of small birds were on the beach, a sudden scurrying for cover, accompanied by many alarm notes from birds and numerous

chipmunks, attracted our attention. A small black hawk, fast on the wing, flew past and alighted on a dead pine half a mile up the beach. For some time not a bird or other small creature uttered a sound or ventured into the open. The hawk was collected and proved to be an immature female. Nearly every day from August 5 to August 25 one or more of these hawks were seen near our camp, and each time the birds and chipmunks exhibited extreme fear. Another immature female was collected on August 25.

The stomachs of the birds taken were examined and found to contain only fragments of black ground beetles. As near as I could determine there were five or six Black Pigeon Hawks at Paulina Lake during our visit. Only once before have I seen this species east of the Cascade Mountains. A specimen was collected at Heppner, Morrow County, Oregon, on July 31, 1929, by H. W. Dobyns and given to me. It also was a bird of the year, an immature male. Is it possible these could be migrants or does *Falco c. suckleyi* breed that far inland?—STANLEY G. JEWETT, *Portland, Oregon, September 27, 1938.*

Two Notable Records for Arizona.—*Colaptes auratus auratus.* Southern Flicker. An aged female of this species was taken by me April 7, 1937, from a grove of large live oak trees in the valley of the Gardiner Wash, northern Santa Cruz County, Arizona. The Gardiner Canyon and Wash originates from the east side and slopes of the Santa Rita Mountains, coursing eastward and northeastward. Since coming to this region, I have been on the lookout for a specimen of Mearns Gilded Flicker, and presumed I was obtaining one of such until it was in hand. Said bird was excessively fat which I cannot account for excepting by its food of acorn kernels. Flickers are often seen working the acorns over, on the ground beneath the oaks. I have read that this species is likely to drift westward from the southern states, across Texas, Arizona and into southern California. Flickers of this region are resident the year round and I should not consider that this bird was in seasonal migration only.

Chloroceryle americana septentrionalis. Texas Kingfisher. An adult female was taken at a pond on the Santa Cruz River, seven miles north of Nogales, October 1, 1938. No others were in the vicinity at the time. A kingfisher must have a discouraging time trying to locate streams with fish in this region. The best effort they can make is hopefully to follow the dry courses of our "rivers" (so called by courtesy). It is not uncommon to see the Western Belted Kingfisher flying up and down a dry wash. Therefore an artificial pond anywhere in this region will narrow a search for a kingfisher down almost to a certainty.—FRED M. DILLE, *Nogales, Arizona, January 11, 1939.*

Telephone Wires Fatal to Sage Grouse.—On October 20, 1938, Mr. W. S. Long and the writer found three Sage Grouse (*Centrocercus urophasianus*) that, evidence indicated, had been killed as a result of striking telephone wires. One adult hen was found beneath a telephone line five miles north of Beaver, Beaver County, Utah; and four miles farther south under the same line a cock and a hen, both adults, were found. All three apparently had been dead about twenty-four hours, and were in excellent plumage which showed little evidence of external damage. The crops of the three birds and the skins of the two hens were preserved. While skinning the specimens they were examined carefully for signs of injury. There were no broken bones and the skulls were not damaged, but the throats of both hens were bruised and contained clots of blood, and the shoulders and fore part of the breast of one showed slight bruises. The position of the birds beneath the telephone line and the fact that the skins were not torn and no bones were broken would indicate that they had flown into the telephone wires rather than having been struck by automobiles. The skin of the male was intact and no bones were broken except the skull which was crushed; tracks indicated that the head of this bird had been stepped upon by a cow after the bird was dead.

The situation along this stretch of highway is such as to be conducive to this type of avian accident. The west side of the highway is bordered by uncultivated flats which extend back to sagebrush-covered mesas. On the east side are pastures, grain fields and alfalfa patches. Along the edge of the fields that adjoin the road is a fence and the telephone line. The telephone poles support ten wires, eight of which are attached to the top cross-bar and are approximately eighteen feet above the ground; below these are two wires about a foot apart which are attached to the poles.

Under these conditions it appears that the likelihood of Sage Grouse striking the wires as they fly back and forth between the sage flats and the alfalfa fields would be great. The greatest damage probably occurs when the birds are suddenly flushed from the alfalfa and strike the wires before they are able to gain sufficient altitude to clear them. The crop of one was distended with green forage which undoubtedly had been obtained in the alfalfa patch. Being heavy with food may also make the birds less agile at dodging obstacles.

Of course, this is only one incident and may not be significant, but it does demonstrate one more obstacle that man has introduced into the environment of this fine game bird. Further observations

may show that in certain areas this hazard is serious enough to warrant consideration of preventive measures.—A. E. Borell, *Soil Conservation Service, Albuquerque, New Mexico, November 19, 1938.*

Remarks on Alaskan Savannah Sparrows.—In the recent revision of the Savannah sparrows by Peters and Griscom (Bull. Mus. Comp. Zool., vol. 80, 1938, pp. 445–478), the name *Passerculus sandwichensis crassus* is given (p. 459) to a medium-sized, stout-billed bird, the breeding range of which is said (p. 460) to be "Islands in the Alexander Archipelago from Chichagof Island to Prince of Wales Island; also on the adjacent mainland at the Chickamin River."

An examination of southeastern Alaskan specimens collected by the writer demonstrates that, while there are numerous examples of migrants that answer the description of *crassus*, six breeding birds, three males and three females (L. A. Mus., nos. 18627–18632), from Petersburg, Mitkof Island, taken between June 27 and July 1, 1936, are clearly not of that form, their bills being much too slender. These specimens were submitted to Mr. Griscom and examined by him and Mr. Peters, both of whom agree that they are not examples of *crassus* but of the bird they call *anthinus* (*alaudinus* of the 1931 A.O.U. Check-list). As Petersburg is almost in the center of the breeding range ascribed to *crassus*, it would seem that the limits of this range require redetermination.

While Peters and Griscom list birds taken on Kuiu Island as breeding examples, they do not give dates of capture. Swarth (Univ. Calif. Publ. Zool., vol. 7, 1911, p. 85), referring to specimens taken by the 1909 Alexander Alaska Expedition in this locality May 3, apparently regarded them as migrants, which they undoubtedly were at this early date. However, Swarth does consider specimens taken at Chickamin River, on the mainland, in June, breeding birds, but Peters and Griscom do not mention these as among the materials they examined.

It might be well here to call attention to an error in the range of *Passerculus s. sandwichensis* as given by Peters and Griscom (*op. cit.*, p. 449). This should read: "Not definitely recorded from any of the Aleutians *west* of Unalaska," not *"east"* of that point. In this connection the writer is able to record a slight extension of the range of *sandwichensis*. While on Umnak Island, the next island west of Unalaska, the summer of 1926, the bird was found to be breeding rather commonly. A juvenal (no. 3621, coll. G. W.), still unable to fly, was taken August 18.—G. Willett, *Los Angeles Museum, Los Angeles, California, January 5, 1939.*

Two New Bird Records for Utah.—The names of two species of birds may now be added to the list of those collected in the State of Utah. One male Indigo Bunting, *Passerina cyanea*, in the collection at Dixie College was taken July 11, 1937, at Saint George, Utah, by Floyd Atkin, a student.

May 20, 1938, two boys, Ralph Hafen and the late Richard Klenk, obtained a Least Bittern, *Ixobrychus exilis*, from one of the small marshes near the Rio Virgin at Saint George. The skin is in my personal collection.—Ross Hardy, *Dixie College, Saint George, Utah, December 20, 1938.*

Notes on Shorebirds from the San Francisco Bay Region.—*Steganopus tricolor.* Wilson Phalarope. Approximately two miles northeast of the Mackay Radio towers near Palo Alto, Santa Clara County, there was a group of large ponds kept at constant level by dikes originally erected by a salt company. These ponds were rather shallow with large areas covered by an inch or less of water. On July 30, 1937, when the writer was with E. W. Martin, numbers of Wilson Phalarope were noted, and during the following two weeks, until August 14, they were seen practically every day. Some days their numbers were estimated at five or six hundred, wading for the most part in the shallow portions of the ponds. A few could sometimes be seen swimming with the Northern Phalaropes in the deeper parts of the pools. There were large numbers of Western Sandpipers feeding along the edges of the water, and the Wilson Phalaropes were scattered among them. Because of their seemingly infrequent occurrence in the Bay region, some were collected and one of these, a male, is now number 74515, Mus. Vert. Zool. It might be added that these ponds have been drained by a new system of water channels, and this year no Wilson Phalaropes were seen.

Numenius hudsonicus. Hudsonian Curlew. Observed on the mud flats east of the Mackay tower near Palo Alto, until June 4, 1937, which appears to be a late record (see Grinnell and Wythe, Pac. Coast Avif. no. 18, 1927, p. 71). One, a female, obtained June 2, 1937, is in my collection.

Limosa fedoa. Marbled Godwit. Noted until June 5, 1937, near Palo Alto, on which date a female was collected.

Catoptrophorus semipalmatus inornatus. Western Willet. Seen on the mud flats near Palo Alto until June 5, 1937, on which date several were collected, which seems to be a late record (Grinnell and Wythe, *op. cit.*, p. 70).

Heteroscelus incanus. Wandering Tattler. An early record for the Bay region (Grinnell and Wythe, *loc. cit.*) was obtained when a Wandering Tattler (female number 170) was collected at Pescadero Point, San Mateo County, on April 29, 1938. Six Tattlers were observed that day in a two-mile stretch south of Pescadero Point.

Totanus flavipes. Lesser Yellow-legs. Three were seen July 23, 1938, on a sand bar in the Gualala River, Mendocino County, California, about two miles up from the mouth. The identification has been checked by Mr. Frederick Test from one collected July 24 (male, number 317).—WALTER F. NICHOLS, *Pasadena, California, January 3, 1939.*

Purple Finches Feeding on Cotoneaster Berries.—About mid-morning of January 21, 1939, a group of California Purple Finches (*Carpodacus purpureus californicus*), including at least four males and one female, was seen apparently feeding on the berries of the silverleaf cotoneaster (*Cotoneaster pannosa*). This is the form which often grows into a slender tree, with graceful, drooping branches. The light red, dull surfaced berries remain on the tree all through the fall and winter. In contrast with the robins' swallowing of whole berries, the finches' method was to bite off the top or side of a berry and eat the contents "on the half-shell." When a berry did come off the stem, a finch seemed at a loss what to do with it, fumbling it in the beak and soon letting it drop. Clicking of beaks suggested cracking of seeds, and skins and pulp were lavishly wasted.

Later examination of the berries disclosed a single, fairly large, roundish, white seed in the center. Little berry cups from which the seed had been neatly removed were conspicuous on the twigs. It is interesting that birds which are normally seed-eating should seek out this relatively abundant hidden supply, available to them at a time of year when other seeds are scarce.—FRANCES CARTER, *Berkeley, California, January 22, 1939.*

NOTES AND NEWS

At a meeting of the Board of Directors of the Cooper Ornithological Club held at Los Angeles January 20, 1939, it was unanimously voted to postpone the next Annual Meeting of the Club until 1940, the exact date to be set at a later meeting of the Board. The reason for this action was that a consensus of opinion of leading members of both divisions of the Club supports the advisability of concentration of the efforts of the Club on the success of the Annual Meeting of the American Ornithologists' Union, to be held in the San Francisco Bay region in June of this year.—HOWARD ROBERTSON, *President;* GEORGE WILLETT, *Secretary.*

The Fifty-seventh Annual Meeting of the American Ornithologists' Union is to be held in the San Francisco Bay region June 19 to 23. Headquarters will be at the University of California, in Berkeley, where the business sessions on June 19 and scientific sessions on June 20 and 21 will be held. On June 22 the scientific program will be continued at the California Academy of Sciences in Golden Gate Park, San Francisco. Members of the Union are reminded that nominations for Fellows and Members, to be presented at the business sessions, must be sent to the secretary, Dr. Lawrence E. Hicks, Ohio State University, Columbus, Ohio, three months in advance, that is, by March 19. The official hotel selected for the meeting is the Durant, in Berkeley, which is close to the University campus. Reduced fares from the East have been announced by railway companies to facilitate travel to the San Francisco World Fair this summer. Local members of the Cooper Ornithological Club warmly urge all who can to attend the meeting of the Union, and we wish especially to aid in arrangements for field trips so that on June 23 and 24 all persons wishing to see something of Pacific coast bird life may have the best of opportunities.—A. H. M.

On February 4, 1939, the Cooper Ornithological Club lost, by death, one of its most accomplished out-of-doors bird-watchers, Ernest I. Dyer, of Piedmont, California. For some six years past, Dyer had occupied himself most of the hours of every day, on his woodsy place at 40 Selborne Drive, keeping "log" of the behavior of his avian associates; his observations were recorded hour by hour, typewritten by himself with a trained engineer's precision and illustrated by drawings and photographs. These records had come to comprise many manuscript volumes; but Dyer was reluctant to publish—his pleasure was gained in watching and recording. He was, as it happened, prevailed upon only recently to write up an experience of his with a nesting Allen Hummingbird, and the article appears in this issue of the Condor (p. 62). It demonstrates his technique in observing. He assumed the rôle of the birds' *companion;* he never caught, banded, or even

held for one moment any wild, uninjured bird. (Neighbors often brought him birds crippled by flying into wires or windows; of these, the ones that recovered he released at a distance, back in the Oakland hills.) By his method, he established perfect confidence in the birds on his place—thrashers, road-runners, spotted towhees, hermit thrushes, and the rest—using meal-worms as "medium of approach." The most intimate association thus resulted, enabling Dyer to detect individual traits of behavior to an extent the under-initialed never knew of, or read of, anywhere. His daily notes were interpretive, as well as factual, but subject to his own reappraisal as to significance—again as illustrated in the Allen Hummingbird article. While Dyer left little on published record, he regularly attended meetings of the Northern Division of the Club, when almost always he contributed some pointed observation, some fresh experience of his with "Rhody" (the road-runner), occasionally a whole evening's program illustrated by movies he had taken of his "companions" at 40 Selborne. Dyer's work and influence in the field of interpretive bird-behavior will long endure.—J. G.

There is, we feel, increasing and justified complaint among working bird students against certain unnecessary intricacies in the current handling of scientific names. One of these unnecessary practices is described, and on the best of grounds condemned, in a vigorous and convincing article by Wilfred H. Osgood in *Science* (vol. 89, January 6, 1939, pp. 9–11). This is "the practice of enclosing in parenthesis the authority for specific or subspecific names which have been transferred from one genus to another. To discontinue this would be a blessing to the active taxonomist, to whom it is now needless, and also to the layman, to whom the name itself is a sufficient irritation without this added esoteric source of mystification." We agree with Dr. Osgood precisely, after close reading of his presentation of arguments, pro and con; and accordingly, the editorial board of the Condor has decided thenceforth uniformly to omit all such parentheses, unless definitely asked for by an author of an essentially systematic contribution. Also, in another circle, at the California Museum of Vertebrate Zoology, including mammalogists and herpetologists as well as ornithologists, by unanimous vote the same intention was expressed. A related usage, long ago adopted by the Condor, and continuing in application, is the omission of "authorities" altogether for scientific names which are on the A. O. U. Check-list, whereto any inquiring student will be intelligent enough to refer for the histories of names. The majority of even the most "professional" ornithologists now-a-days are more interested in *birds* than in the artificialities of nomenclature.—J. G.

Two Cedar Waxwings trapped by Charles H. Feltes in Modesto, California (see Condor, vol. 38, 1936, pp. 18–23), February 17 and April 14, 1935, were recovered, respectively, January 8, 1938, at Phenix City, and March 29, 1937, at Meridianville, both these points being in *Alabama*. These recoveries were reported on the authority of May T. Cooke (Bird-Banding, vol. 9, 1938, p. 188) and betoken an almost extreme degree of east-west vagrancy as among North American passeriform birds. Phenix City is on the far eastern border of Alabama; approximately 2100 miles intervene between that point and Modesto. But no one knows what zigzag courses, north and south, those birds had followed during the interval of *time*. Cedar Waxwings *are* "vagrants," in the real sense of that word!—J. G.

In this day of effort to replenish marshlands, sloughs and ponds that have been foolishly drained, a book has come out, of immediately practical value toward restoring in these places the desired aquatic vegetation. This is by W. L. McAtee, a long-time authority along this very line; and the title is "Wild Fowl Food Plants, their Value, Propagation, and Management" (Collegiate Press, Ames, Iowa, 1939 [our copy received January 19]; $1.50). The plants recommended and described are native American ones, not exotic ones, and those that are definitely known to provide subsistence in important measure for one or another kind, or group of kinds, of native ducks, geese and swans. Of course, in thus serving essentially from a game-production standpoint, the same plants afford subsistence also to a host of other kinds of aquatic birds and to associated animal life in general. The book will be useful to many people besides those who operate in the interests of sportsmen.—J. G.

A few of the more serious-minded of our western bird students appear to be genuinely disturbed at the annually repeated announcements, by radio and in the daily press, of the departure and arrival of the "mysterious golden breasted swallows" at Mission San Juan Capistrano, their absolute punctuality being said to be a tradition at that mission. "Each St. John's Day, as they have always done on October 23 for the past 150 years, the birds have risen in one mass flock numbering more than 2000, wheeled over the mission, and disappeared out to sea. Just as mysteriously they reappear out of the sky the following year on the day dedicated to St. Joseph, March 19, and again take up residence in the eaves of the mission." And so on, modified and amplified as limited only by the elasticity of the narrator's imagination. Now this is a pleasing little legend; it must arouse in the average reader's mind only peaceful reflection, a healthy *regard* for bird-life. Why should anyone, even

the drabbest devotee of "factual" biology, allow himself to be irked! Certainly this swallow story is innocuous as compared with the mass of animal lore currently fed to the public, much of which directly or insidiously incites to thoughts of killing for "sport" or destruction as "vermin." The germ of truth that is there is no less elusive in one connection than in the other! No, our own reaction is not at all of the ruffled sort. Incidentally, we would advise anyone interested in the facts, to read Florence Merriam Bailey's delightful article (Condor, vol. 9, 1907, pp. 169-172, 2 figs.) written about the Cliff Swallows and White-throated Swifts as she herself observed them over thirty years ago at Mission San Juan Capistrano. It would appear, however, that the swallow tradition was not at that time current; it may have been dormant just then!—J. G.

We have been wondering whether it would not be a welcome move in behalf of the great majority of bird students if authors of state lists, faunal analyses, and local lists generally, would take pains to use, for all the birds they deal with, the best known, or most used, or A.O.U.-sponsored, names, scientific as well as vernacular. That is to say, let nomenclatural innovations be altogether avoided in contributions of primarily non-systematic aim. To make the point clearer, we would refer in illustration to Oberholser's recent "The Bird Life of Louisiana," an account of the avifauna of that state, wherein the lay reader, for whom the style of writing otherwise seems to be gaged, is confronted with a considerable number of new names and new or at least unfamiliar combinations of scientific names. This circumstance is inevitably more or less confusing not only to a host of beginning bird students but also to advanced ornithologists who happen to be specialized in some sub-field of study not systematic in nature. We ourselves look back to published papers of our own which we now see showed in this same regard poor taste, to put it mildly. Wouldn't it have been vastly better to have kept out of that character of paper all supposedly new or unusual names and nomenclatural comments, to present separately in technical papers, in form adapted for those few readers who are specially interested in such matters? Many proposed nomenclatural innovations prove never to "take"; that is, they prove not justified —are not adopted by subsequent thoroughgoing group revisers or by the A.O.U. Committee. Meanwhile, the "synonymy" of each species affected has grown—citations in the literature made harder to run down. Perhaps every ten years is often enough for the general ornithologist to be expected to bring his avian terminology "down to date." Nomenclature should be so employed as to *aid* in the advances of ornithology; in itself it is *not scientific ornithology*.—J. G.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

OCTOBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, October 27, 1938, at 8:00 p.m., in Room 2503 Life Sciences Building, Berkeley, with President Emlen in the chair and about one hundred members and guests present. Minutes of the Northern Division for September were read, approved, and later corrected. Names proposed for membership were: Lowell Adams, Yosemite, California, and (Miss) Phyllis Neale, Avenal High School, Kings County, California, by Thomas L. Rodgers; Mrs. Gilbert Newton Lewis (Mary H.), 2728 Belrose Avenue, Berkeley, by Amelia S. Allen; Ned W. Stone, 2418 California Street, Berkeley, by Margaret W. Wythe.

The secretary read a letter from W. B. Davis, Superintendent of Recreation of the City of Berkeley, to whom suggestions regarding the bird refuge at the Aquatic Park had been sent, as authorized at the previous meeting. Mr. Davis' letter stated that there were no immediate plans to change the natural sanctuary which had developed in the small pool south of the park, and that boats would be kept away from the island by means of a wooden boom so that waterfowl might feed there undisturbed.

Field reports were opened by Mr. Dixon, with the unusual record of seventeen Townsend Solitaires in sight at one time, feeding on gooseberries on Telescope Peak, Death Valley National Monument. In travelling toward Zion National Park, by way of Kern Basin, he had seen five Road-runners in less than five miles. Mrs. Mead reported a Western Gnatcatcher, September 25, feeding in the manzanita bushes at Fallen Leaf Lake, elevation about 6300 feet. Townsend Solitaires were seen feeding on juniper berries, as they had two years previously, but only one was in full song this year. A novel experience was related by Dr. Painton. While proceeding slowly on an upgrade near Mt. Herman, he noticed two California Woodpeckers fighting in the road, while a third looked on from a little distance. He centered his car so that the wheels would not touch the fighters, and so intent were they that they permitted the car to pass over them without pausing in their altercation.

Mr. Joseph S. Dixon, speaker of the evening, chose as his topic, "Birds of Crater Lake National Park," answering most interestingly the question so frequently asked him by prospective visitors, "What birds will I find there?" The deep lake occupies the crater of an extinct volcano, formerly a large member of the Cascade range comparable to Rainier or Shasta; the cone shows evidences of glaciation on its slopes. The effect of the mountain on bird populations, both past

and present, has been an important one. A subject of primary interest to Mr. Dixon has been the faunal relationships of the birds inhabiting the mountain. Whether they are with the Cascade fauna to the north, humid coast to the west, Great Basin to the east or Sierran to the south cannot be surmised for any species until specimens have been taken.

Mr. Dixon's work has been supplemented by that of Loye Miller and Alden Miller in 1926 and 1927, and more recently by that of Ralph Huestis and Elmer Aldrich.

Records of the migration of Canada and Snow geese, kept by Mr. Frost, show a definite route southward along the coast to a point opposite the mountain, where a sharp turn is invariably made, the geese then proceeding eastward to the Klamath Basin. The Crater Lake area is still a fruitful one for bird observers, and there is ample opportunity for adding to the present list of 113 recorded species.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

NOVEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, November 17, 1938, at 8:00 p.m., in Room 2503 Life Sciences Building, Berkeley, with sixty-six members and guests present. In the absence of both president and vice-president, Mr. Kinsey kindly took the chair. Minutes of the Northern Division for October were read and approved. Minutes of the Southern Division for August and September were read by title. Names proposed for membership were: David R. Kinkead, 330 Castilleja Avenue, Palo Alto, California, by Wilbur V. Henry; Mrs. Mary Jane Nichols, Route 2, Box 194, Tucson, Arizona, by Alden H. Miller; James Rooney, Route 7, Yakima, Washington, by J. Grinnell (per A. H. M.); Mrs. George Burwell Wright, 2822 Piedmont Avenue, Berkeley, by Mrs. J. T. Allen.

Mr. Dyer, speaking for Mr. Covel, stated that the clearing out of all underbrush in lower Dimond Canyon, as a fire prevention measure, was destroying one of the last primitive areas extending deeply into Oakland. The effect on bird life, as well as the creation of an erosion hazard, is obvious. It was moved and carried that the secretary be instructed to write a letter to Mr. Fred Carlson, Fire Marshal of Oakland, in full charge of the work, offering the Club's services in an advisory capacity, with a view to preventing further destruction of similar valuable natural areas. It was moved and carried, further, that any member or members wishing to call in person at the Fire Marshal's office, regarding this matter, be authorized to do so as official representatives of the Club. [Letter from the Recording Secretary is appended.]

Mr. E. L. Sumner, Sr., reported a White-throated Sparrow at his home in the Santa Cruz Mountains, October 30, and another on November 1. Several additional reports were given for this species, and it was suggested that the records might indicate increase either in numbers of birds or of observers. Mr. Cain announced that the Sears Point Cut-off would soon be opened as a free road, without toll, and speculated as to what effect the expected increase in traffic might have on the birds of the vicinity. Recently, with a party of boy scouts on this road, he had observed numerous Egrets, four Short-eared Owls, and Avocets estimated to number around 500.

Four speakers contributed to the evening's program. Mr. Alden H. Miller reported briefly on the Washington meeting of the American Ornithologists' Union, held October 17-21. He spoke of the large attendance, the fine quality of the papers presented, and the privilege of meeting such well known figures in ornithology as Leonhard Stejneger, Witmer Stone and Frank Chapman. Mr. David Johnson described the work of two expeditions by members of the Museum of Vertebrate Zoology to the Providence Mountains and nearby ranges at the California-Nevada-Arizona borders, in December-January 1937–38, and May-June 1938. The possibility of isolation and speciation in these desert mountains was suggested and the large number of northern species wintering there noted. Mr. Frederick H. Test related some of the highlights of a trip into eastern Oregon, by a party from the Museum of Vertebrate Zoology, last summer. He gave a word-picture of the birds to be found in the various types of plant association encountered there, in country ranging from desert plains to forested mountains. Mr. Thomas L. Rodgers demonstrated effectively the nuptial note of the male Anna Hummingbird, using only the outer tail feathers mounted on a bamboo rod. Just what position is taken by these feathers as the bird produces the sound at the bottom of its dive remains to be shown by slow motion pictures.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

1626 Le Roy Avenue,
Berkeley, California,
December 16, 1938.

Mr. Fred Carlson, Fire Marshal,
Fire Prevention Bureau,
City Hall,
Oakland, California.

Dear Mr. Carlson:

Attention of the Northern Division of the Cooper Ornithological Club has been called to the work of clearing parts of Dimond Canyon as a fire prevention measure. Since Dimond Canyon is one of the few remaining primitive areas extending deeply into Oakland, and since such areas are of primary importance to the native

bird life, the Cooper Club feels justified in taking an active interest in the project.

There are always many aspects to such measures; we should like to bring to the fore certain of them which may have been overlooked. Destruction of the natural cover of such slopes necessarily involves the destruction of the habitat of many bird species which are of interest to residents of the vicinity, as well as to organizations such as the Boy Scouts. Then, too, there might be question as to the effect of the coming rainy seasons on the bared slopes; whether an erosion hazard has been substituted for a fire hazard. Finally, in this day of a cigarette-flinging motoring public, it might be asked whether anything short of paving the whole countryside with concrete would constitute really effective fire prevention. Briefly, does the amount of protection from fire afforded by these measures compensate for the complete disfiguration of the area from the nature-student's point of view?

Since the value of lands from the naturalist's viewpoint may not always be apparent to those approaching the problem from other aspects, the Cooper Club would like to offer its services in an advisory capacity, in view of any possible future work projected along these lines. There are members well acquainted with conservation and management of wildlife resources, who would be willing to apply their knowledge and experience to the present case. The work in lower Dimond Canyon has of course progressed nearly to completion. However, we should like to ascertain whether any work of a similar nature has been proposed for the few remaining natural areas in the vicinity of Oakland.

It is to be hoped that, through co-operation of the various interests involved, some agreement may be reached, so that necessary fire prevention measures may be carried out, without damage to wooded areas.

Very sincerely yours,
(Signed) FRANCES CARTER,
Recording Secretary,
Northern Division,
Cooper Ornithological Club.

DECEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, December 15, 1938, at 8:00 p.m., in Room 2503 Life Sciences Building, Berkeley, with President Emlen in the chair and forty members and guests present. Minutes of the Northern Division for November were read and with correction approved. An application for membership was read from Mr. (Henry) Shirl Coleman, Pioche, Nevada, endorsed by William H. Behle.

Mr. Miller read a communication from Mr. Laidlaw O. Williams, district chairman of a committee of the National Association of Audubon Societies for gathering data on the White-tailed Kite, with a view to its conservation. Co-operation of the Cooper Club was asked. All records will be held in strict confidence and should be sent to Mr. Williams at Box 453, Carmel, California. Mr. Miller also announced that copies of Part I of The Life History of the Song Sparrow, by Margaret Morse Nice, were available at the Museum of Vertebrate Zoology, at the price of $1.50.

The president appointed as nominating committee for Division officers for the ensuing year: Mrs. J. T. Allen, Mr. Ernest I. Dyer, and Mr. Joseph Dixon, chairman.

Field reports were numerous. Mr. Dyer had noticed a White-throated Sparrow about his home in Piedmont ever since November 4. December 14 was his first date for the Varied Thrush. Mr. E. L. Sumner had observed a Black-chinned Hummingbird at La Jolla, California, on December 4. Mr. James Moffitt reported more ducks and geese throughout the Sacramento Valley than at any time since 1929-30. At Tomales Bay, 2 or 3 thousand Black Brant arrived on October 27, remaining only 2 weeks; again, on November 23 and 24 around 15 hundred were present. At Los Baños, on November 28 and 29, Mrs. Kelly found ducks and geese concentrated to a number approximating 700 thousand on 23 acres; Pintails, Shovellers and Green-winged Teal predominated. Mr. Emlen concurred in these observations, adding a record of some 350 thousand ducks, 80 per cent Pintails, at Suisun. Mrs. Allen had seen an unbanded European Widgeon on Lake Merritt December 13, and in a garden on Chabot Road in Oakland, a Virginia Rail. Dr. Painton counted 55 species as the reward of a birding trip from the Stanford campus to Searesville Lake, November 27. On the lake, 8 Whistling Swans (2 adult and 6 young) were present November 26.

The evening's speaker, Mr. Tracy I. Storer, presented a summary entitled "Recent Trends in the Study of Birds." Basing his outline on a review of past trends, Mr. Storer obtained a perspective on the whole field of ornithology and its history. Highlights in the account were: The natural and unnatural history of the ancients; the bringing in of specimens during the voyages of discovery; the Linnaean system of classification; first protective legislation in the late 1700's; the impetus lent by Darwin's work; earlier naturalists such as Catesby, followed by Baird, Brewer and Ridgway, and the magnitude of Audubon's contribution; the first A.O.U. Check-List in the middle 1880's; the work of C. Hart Merriam and Wells W. Cooke on migration; Forbes at Illinois and Beal of the Biological Survey on food habits; new tools in the camera and

automobile; banding as a technique for the study of individuals; the territoriality thesis; application of experimental techniques. Modern trends, discussed in some detail, may be considered in a word as the refining of techniques along many of the same lines. Examples are: The correlation of laboratory with field work in the study of ecology, including food and cover requirements, predators, sickness, and the relation of man and birds; photoperiodism and gonads; recording and accurate analysis of bird song as begun by Albert Brand. As for the future, the sky is the limit, concluded Mr. Storer.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

SOUTHERN DIVISION

OCTOBER.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum, Exposition Park, on Tuesday, October 25, 1938, at 8 p.m., with about 80 members and guests present and Mr. McCoy presiding. The minutes of the September meeting of the Southern Division were read and approved. A telegram from Laura and Harold Bailey, in reply to the Club's congratulatory note, was read.

Mr. McCoy introduced Mr. James B. Dixon, whose subject, The Life History of the Golden Eagle, was presented largely in motion pictures. Mr. Dixon indicated that the real work of taking the pictures should be credited to his son, Ralph Dixon, and Mr. James Fassero, whom he introduced to the group.

In his introductory remarks Mr. Dixon explained that the pictures dealt with a pair of eagles which have nested on the Dixon family ranch ever since he was a boy. One of the pair has been replaced at least twice, but the remaining one in each case maintains the original feeding range. One female is known to have been one of the pair from 1903 to 1933. The birds have nested in sixteen different places on the ranch during those years. In 1938 the nest was located on a rocky cliff, and it is this nest which was photographed.

The pictures began with the two eggs in the nest and continued through the development of the one eaglet (the other egg having been apparently infertile) until it finally flew off the nest and away, approximately 66 days after hatching. The scenes included visits of the mother bird to the nest, as well as many interesting views of the young bird alone. A particularly interesting shot, which drew applause from the group, was a visit of a Costa Hummingbird to the nest when the eaglet was about 8 weeks old, the hummingbird hovering in mid-air about the eaglet, the eaglet watching it intently. After the pictures Mr. Dixon answered several questions from members.

Adjourned.—HILDEGARDE HOWARD, *Secretary.*

NOVEMBER.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum, Exposition Park, on Tuesday, November 29, 1938, at 8 p.m., with Mr. McCoy presiding and about 125 members and guests present.

The minutes of the Southern Division for October were read and approved. Nine applications for membership were read, as follows: Ernest S. Booth, Department of Biology, Walla Walla College, College Place, Washington; John T. S. Hunn, 1218 Prospect Avenue, Plainfield, New Jersey; and C. V. Duff, 1922 Tamarind Ave., Hollywood, Calif., all three proposed by W. Lee Chambers; John Frederick Wohnus, University of California at Los Angeles, Los Angeles, Calif., by Loye H. Miller; Miss Kathryn May Peck, 144 West 9th St., Claremont, Calif., and Miss Elizabeth Irving Ordway, 730 Mayflower Road, Claremont, Calif., both proposed by Myrtle S. Edwards; Harry Lee Heaton, 3753 29th St., San Diego, Calif., by A. M. Ingersoll; D. M. Gorsuch, Regional Office, U. S. Forest Service, Albuquerque, New Mexico, by Mrs. A. Edward Ayer; and Franklin Goodrich Crawford, 1601 Edgewood Drive, Alhambra, Calif., by George Willett.

The president then introduced the speaker, Mr. Robert T. Moore, whose talk on the "Discovery of the first nest of the Tufted Jay, and other rare nests of northwestern Mexico" was accompanied by several excellent reels of motion pictures, largely in color. The pictures were taken in the lagunas and islands along the coast of Sinaloa, Mexico, and included views of nesting birds of about twenty species. Among these were beautiful scenes of the Roseate Spoonbill. This occurrence Mr. Moore believes to be the first record of the nesting of this species on the west coast of Mexico. The Tufted Jay was pictured both in color and in excellent black and white, which showed the markings of the bird to fine advantage. Among other species shown were the Louisiana Heron and Bancroft Night Heron, the Pink-headed Tanager, Fulvous Nightingale Thrush, Red-billed Redstart, and Blue Mockingbird.

At the completion of the films, Mr. Moore introduced Mr. Arthur Barr, his assistant and co-photographer, who related several interesting experiences of the trip. Mr. Chester Lamb who has collected with Mr. Moore for several years was also present and made a few remarks. The meeting concluded with questions to Mr. Moore and general discussion.

Adjourned.—HILDEGARDE HOWARD, *Secretary.*

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